3.1.1 Definition Match

Definitions:

Match the following words to the definitions in the table below.

dependent variable	linear relation	relation
direct variation	non-linear relation	rise
independent variable	partial variation	run
initial value	rate of change	table of values
line of best fit	rate of change	variable

	An orderly arrangement of facts set out for easy reference (e.g., an arrangement of numerical values in vertical and horizontal columns)
	The difference between two consecutive y-values in a table in which the difference between the x-values is constant
	The vertical distance between two points
	The horizontal distance between two points
	A relation in which the graph forms a straight line
	A relation in which one variable is a multiple of the other
	A relation in which one variable is a multiple of the other plus a constant amount
	The change in one variable relative to the change in another

3.1.1 Definition Match (continued)

	The starting numerical worth or starting amount
	A description of how two variables are connected
	In a relation, the variable whose values you calculate; usually placed in the right hand column in a table and on the vertical axis in a graph
	In a relation, the variable whose values you choose; usually placed in the left column in a table of values and on the horizontal in a graph
	A line that best describes the relationship between two variables in a scatter plot
	A symbol used to represent an unspecified number. For example, x and y are variables in the expression x + 2y
	A relation whose graph is not a straight line

3.1.1 Definition Match (continued)

Graph:

Label the following (indicated by the arrows): rise, run and initial value (y-intercept)

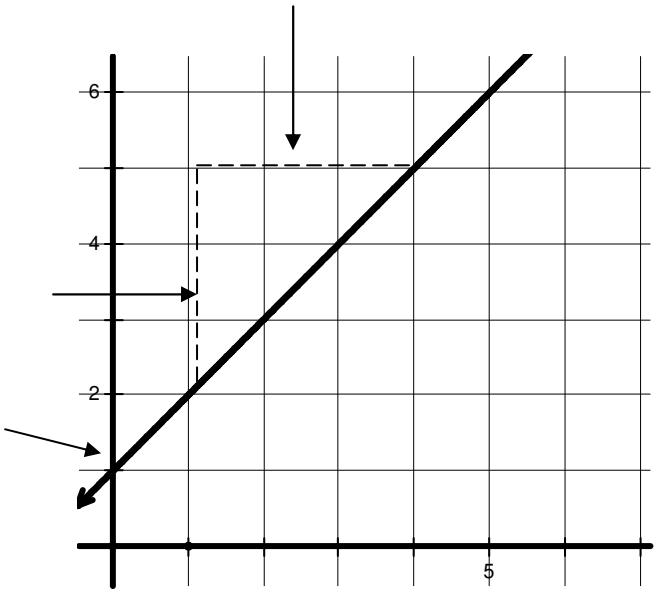
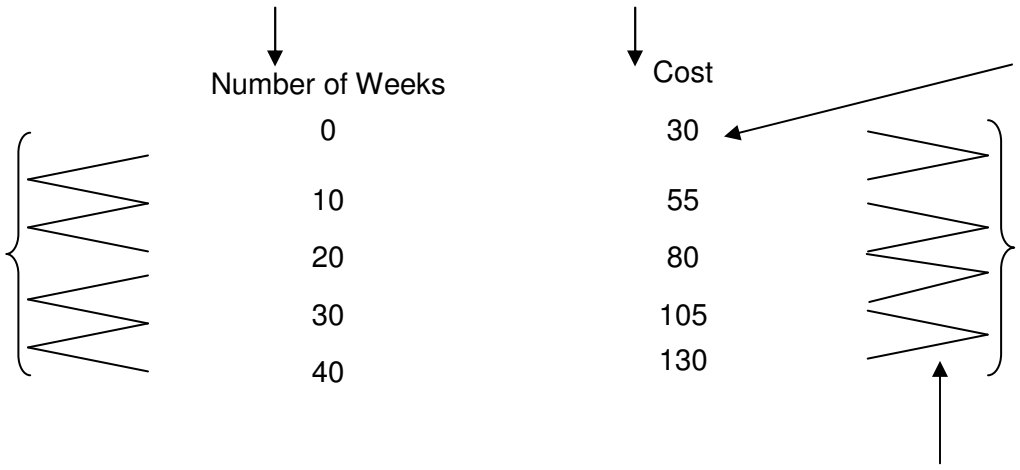


Table of Values

Label the following (indicated by the arrows and brackets): independent variable, dependent variable, initial value (y-intercept), rise, run and first differences



Rate of Change = _____

3.1.4: Thinking About Linear Relations

For each of the 8 scenarios below fill in the appropriate values in the space provided.

1. Another Banquet Hall A banquet hall charges a flat rate of $300 plus $20 per person.	**2. Earning Money** Lindsay earns $10 per hour.
Initial Value:	Initial Value:
Rate:	Rate:
Independent Variable:	Independent Variable:
Dependent Variable:	Dependent Variable:

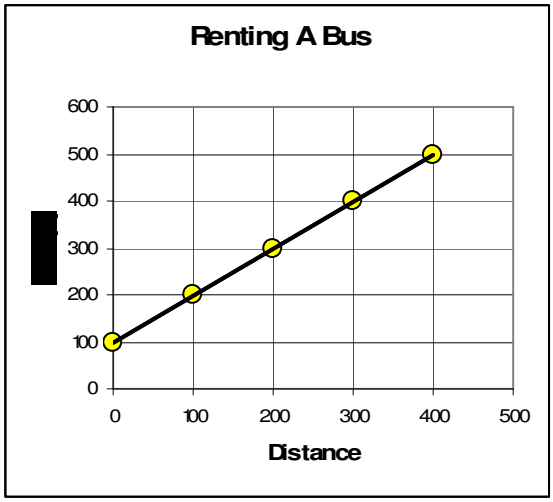
3. Money, Money! Ayda receives a base salary of $200 and $50 for every audio system he sells.	**4. Internet Fees** An internet package charges a flat fee of $10 plus $0.40 per hour.
Initial Value:	Initial Value:
Rate:	Rate:
Independent Variable:	Independent Variable:
Dependent Variable:	Dependent Variable:

3.1.4: Thinking About Linear Relations (Continued)

5. A Runner's Time

Time (s)	Distance (m)
0	0
1	2
2	4
3	6
4	8

6. Cost of Renting a Bus



Initial Value:

Initial Value:

Rate:

Rate:

Independent Variable:

Independent Variable:

Dependent Variable:

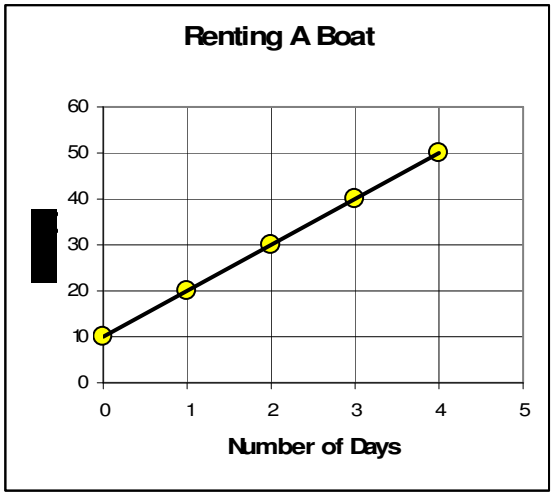
Dependent Variable:

3.1.4: Thinking About Linear Relations (Continued)

7. Chartering a Bus

Time (s)	Cost of Bus Charter ($)
0	10
1	12
2	14
3	15
4	16

8. Cost of Renting a Boat



Initial Value:	Initial Value:
Rate:	Rate:
Independent Variable:	Independent Variable:
Dependent Variable:	Dependent Variable:

3.1.6: A Mathematical Spelling Bee

Procedure

1. You will work in partners where Partner A is the timer and Partner B is the recorder.

2. Create four quadrants by folding a piece a paper in half and fold in half again.

3. With a watch, student A will signal student B to start *printing* the full word **RUN** down one of the paper quarters as many times possible in 10 seconds. This is not a contest print at your normal printing speed.

4. After 10 seconds, student B signals student A to stop printing.

5. Count all the legible words.

6. Record this value in the table below.

7. Repeat steps 1 – 6 for the words **RATE**, **VALUE**, **CHANGE** and **INITIAL**

Recording Data

8. Record this value in the table below.

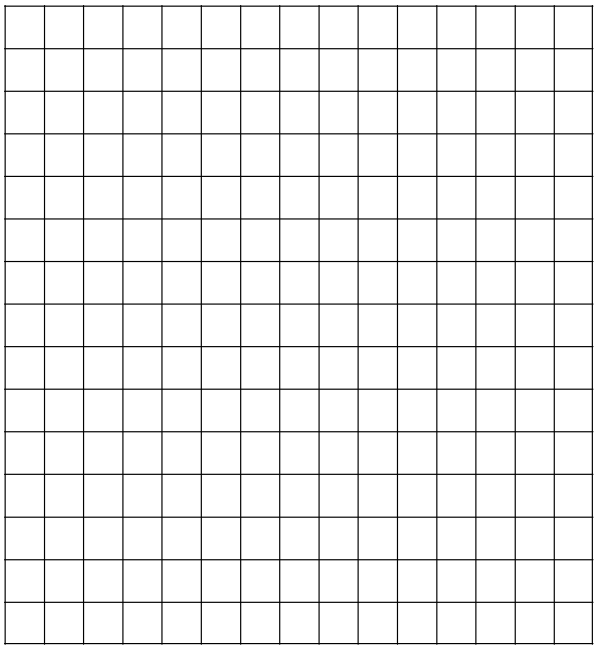
Word	Word Length	Number of Words Written
RUN		
RATE		
VALUE		
CHANGE		
INITIAL		

9. What is the independent variable? _____

10. What is the dependent variable? _____

3.1.6: A Mathematical Spelling Bee (Continued)

11. Create a scatter plot from your data on the grid provided. Label the axis with the independent variable on the x-axis and dependent variable on the y-axis.



12. Draw a line of best fit from the scatter plot above. Extend your line to both the x-axis and y-axis.

13. Using a rate triangle, calculate the rate of change of your line of best fit. _____

14. Interpret the meaning of the rate of change as it relates to this activity.

15. At what value does the line cross the y-axis? _____

16. Interpret this value in the context of this activity.

17. At what value does the line cross the x-axis? _____

18. Interpret this value in the context of this activity.

3.1.8: Connecting Graphs with Equations

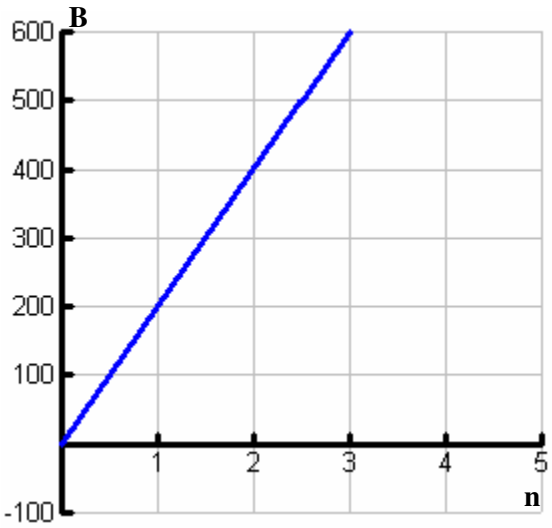
Each of the following graphs gives information about different people's bank accounts.

Independent variable (x-axis): number of weeks (n)
Dependent variable (y-axis): account balance in dollars (B)

For each of the following graphs determine:

a) The rate and the initial value from the graph. Show your work on the graph.
b) A rule in words that relates the balance (B), the number (n) of weeks and the initial amount in the account.
c) An algebraic rule relating the balance (B), the number of weeks (n) and the initial value in the account.
d) Determine how much will be in the account after 12 weeks using the formula.

1. Examine the graph below. Is this person depositing or withdrawing their money? How do you know?



a) Rate: _____ Initial Value: _____

b) Rule in words:

Balance starts at _____ and _____(increases or decreases?) by $_____ per week.

c) Algebraic Rule

B =

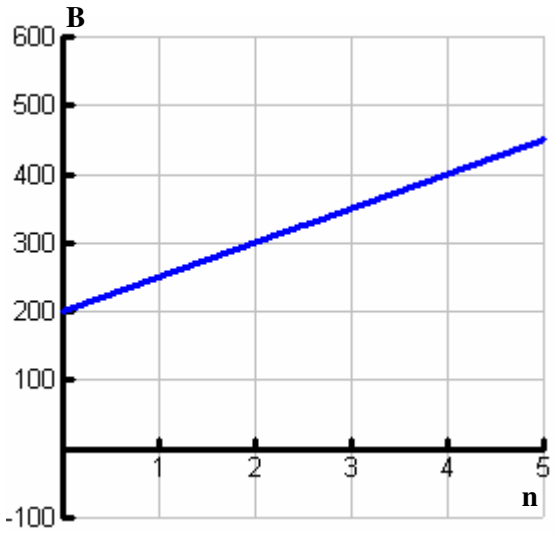
d) How much is in the account after 12 weeks?

On a graph, the **initial value** is shown as the _____

On a graph, the **rate** is shown as _____

3.1.8: Connecting Graphs with Equations (Cont'd)

2. Is this person depositing or withdrawing their money? _____



a) Rate: _____ Initial Value: _____

b) Rule in words:

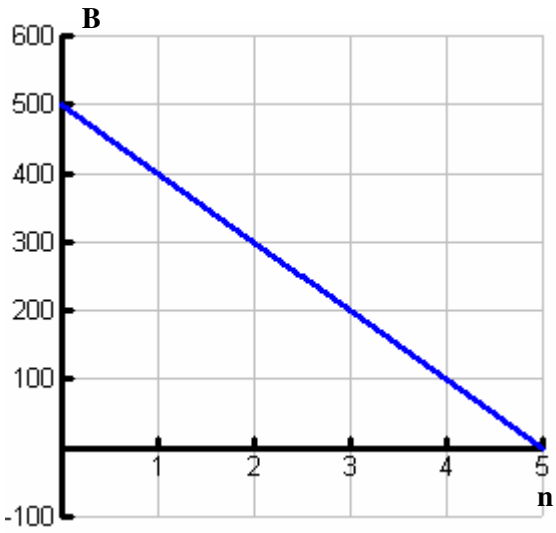
Balance starts at _____ and _____(increases or decreases?) by $_____ per week.

c) Algebraic Rule

B =

d) How much is in the account after 12 weeks?

3. Is this person depositing or withdrawing their money? _____



a) Rate: _____ Initial Value: _____

b) Rule in words:

Balance starts at _____ and _____(increases or decreases?) by $_____ per week.

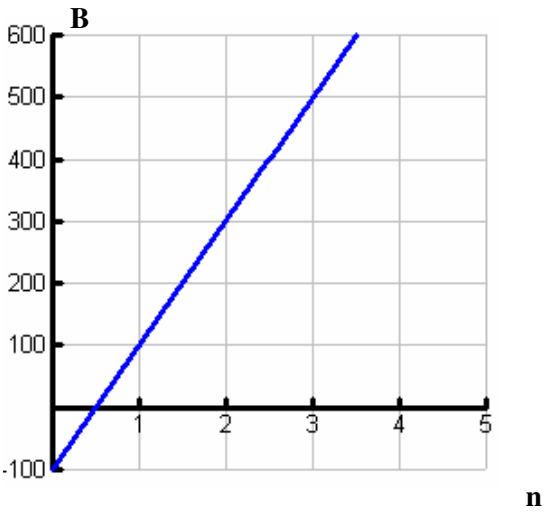
c) Algebraic Rule

B =

d) How much is in the account after 12 weeks?

3.1.8: Connecting Graphs with Equations (Cont'd)

4. Is this person depositing or withdrawing their money? _____



a) Rate: _____ Initial Value: _____

b) Rule in words:

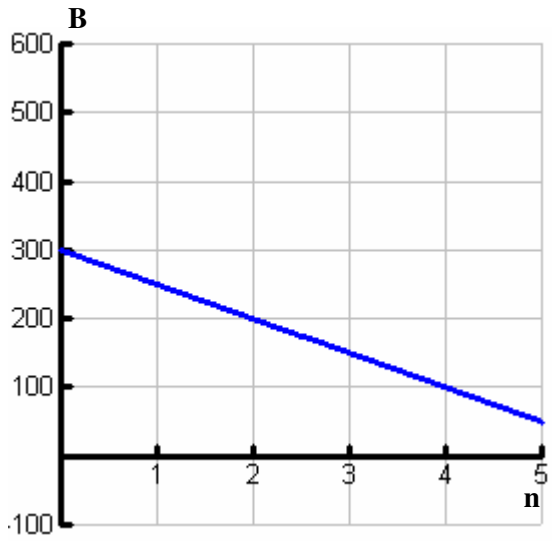
Balance starts at _____ and _____(increases or decreases?) by $_____ per week.

c) Algebraic Rule

B =

d) How much is in the account after 12 weeks?

5. Is this person depositing or withdrawing their money? _____



a) Rate: _____ Initial Value: _____

b) Rule in words:

Balance starts at _____ and _____(increases or decreases?) by $_____ per week.

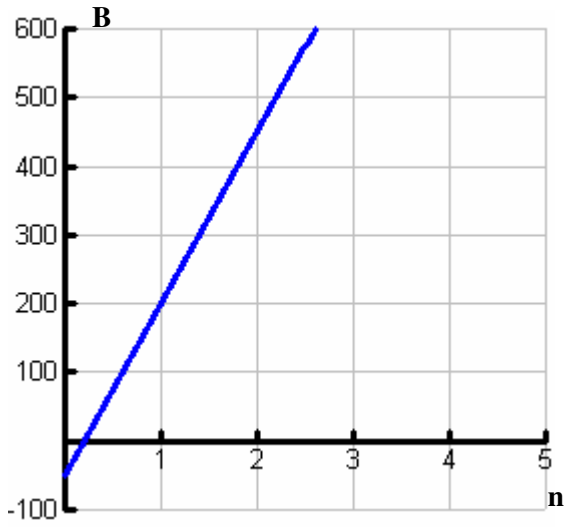
c) Algebraic Rule

B =

d) How much is in the account after 12 weeks?

3.1.8: Connecting Graphs with Equations (Cont'd)

6. Is this person depositing or withdrawing their money? _____



a) Rate: _____ Initial Value: _____

b) Rule in words:

Balance starts at _____ and _____(increases or decreases?) by $_____ per week.

c) Algebraic Rule

B =

d) How much is in the account after 12 weeks?

Questions:

1. Do you think a linear model is the best way to represent the activity in most people's bank accounts? Justify your answer.

2. Sketch a graph to model your own bank account balance assuming you have a job for which you are paid every two weeks, and the bank pays you interest once a month.

3.1.8b: Linear Relations Quiz

1. Earning Money

Steve earns the new minimum wage of $9.50 per hour.

Initial Value:

Rate:

Independent Variable:

Dependent Variable:

Equation:

2. Cost of a Wedding

A banquet hall charges a flat rate of $500 plus $38 per person for a wedding.

Initial Value:

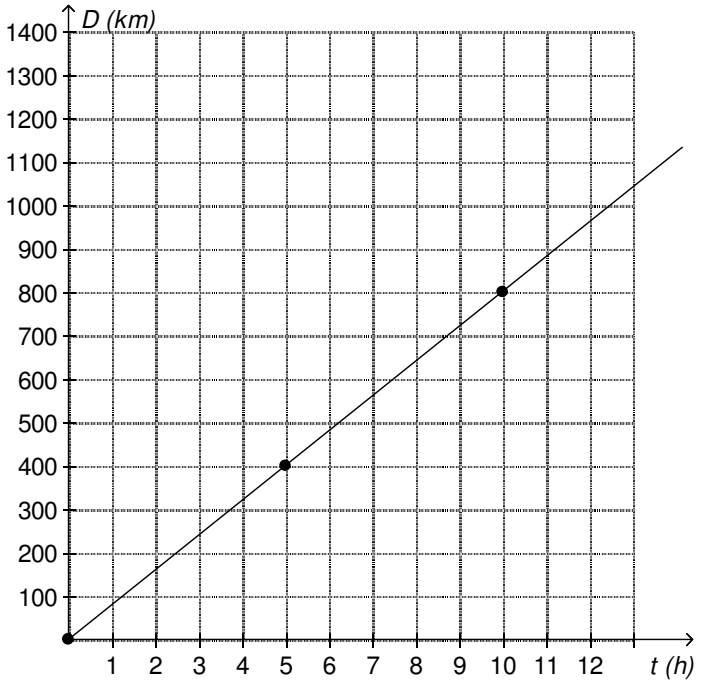
Rate:

Independent Variable:

Dependent Variable:

Equation:

2. The following is a distance-time graph.



a) What is the slope (rate)? _____

b) What is the y-intercept (initial value)? _____

c) Rule in words:

Distance starts at _____ and _____ (increases or decreases?) by _____ km per hour.

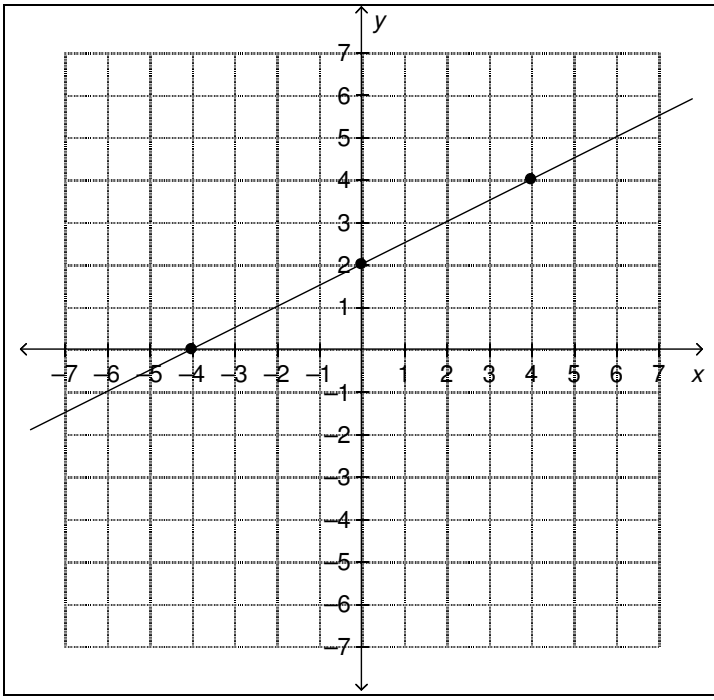
d) State the Equation:

D = _____

e) How far would the driver go in 14 hours at this rate?

3.1.8b: Linear Relations Quiz (continued…)

4. For the following graph:



a) What is the slope? _____

b) What is the y-intercept? _____

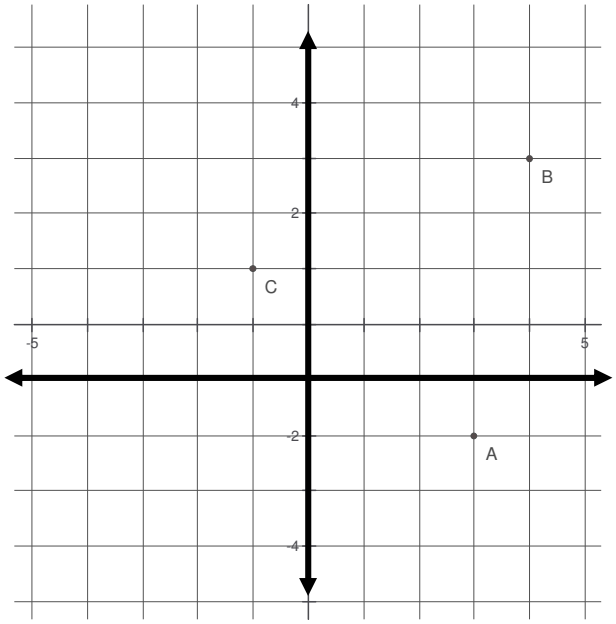
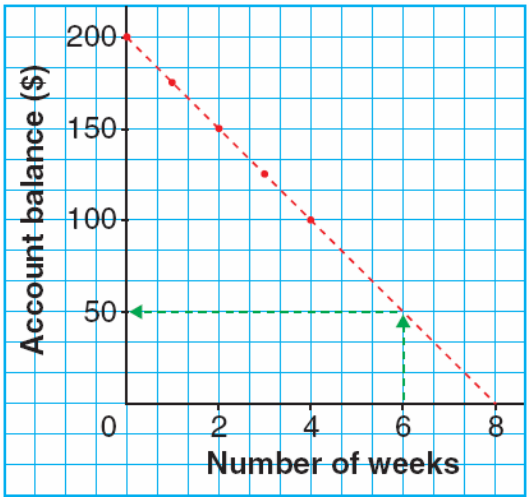
c) State the equation in y = mx + b form:

_____

5. Complete the following table.

Equation	Slope	*y*-intercept
$y = \frac{2}{3}x - 1$		
$y = -3x + 1$		
$y = 2 - x$		
$y = 2$		

3.2.1: Agree or Disagree?

For each question stand if you agree or remain sitting if you disagree.	Class Consensus (Agree / Disagree)
Question #1  a) Point A has coordinates (3, -2) b) Point B has coordinates (3, 4) c) Point C has coordinates (-1, 1) d) Point A is in Quadrant 4 e) The origin is located at (0, 0)	**a)** **b)** **c)** **d)** **e)**
Question #2  a) The rate of change is $25/week b) The initial value is $200	**a)** **b)**

3.2.1: Agree or Disagree? (Continued)

<table>
<tr><th>For each question stand if you agree or remain sitting if you disagree.</th><th>Class Consensus (Agree / Disagree)</th></tr>
<tr><td rowspan="3">Question #3

A family meal deal at Chicken Deluxe costs $26, plus $1.50 for every extra piece of chicken added to the bucket.

a) The rate of change is $26.

b) The initial value is 426.

c) The independent variable is number of pieces of chicken</td><td>a)</td></tr>
<tr><td>b)</td></tr>
<tr><td>c)</td></tr>
<tr><td rowspan="3">Question #4

A Chinese food restaurant has a special price for groups. Dinner for two costs $24 plus $11 for each additional person.

a) The rate of change is $11

b) The initial value is $11

c) The dependent variable is the number of people</td><td>a)</td></tr>
<tr><td>b)</td></tr>
<tr><td>c)</td></tr>
<tr><td rowspan="3">Question #5

<table><tr><th>Number of Toppings</th><th>Cost of a Large Pizza ($)</th></tr><tr><td>0</td><td>9.40</td></tr><tr><td>1</td><td>11.50</td></tr><tr><td>2</td><td>13.60</td></tr><tr><td>3</td><td>15.70</td></tr><tr><td>4</td><td>17.80</td></tr></table>
a) The initial value is 9.40

b) The rate of change is $1.10

c) Dependent variable is the Cost of a Large Pizza</td><td>a)</td></tr>
<tr><td>b)</td></tr>
<tr><td>c)</td></tr>
</table>

3.2.2: Equation of a Line: $y = mx + b$

The PowerPoint file is located at:
http://www.oame.on.ca/main/index1.php?code=grspecres&ph=10&sp=MFM2P

The next few pages contain partial screens for a PowerPoint presentation. As you watch the presentation, take notes and fill in any blanks.

Y-int Slope Form

$y = mx + b$

What does the m and b represent?

Exploring the m

- We already know that in a table of values for a linear relationship a pattern will form. This pattern is the

X	Y
-2	4
-1	6
0	8
1	10
2	12

- Pattern →

Equation →

3.2.2: Equation of a Line (Continued)

Exploring the m

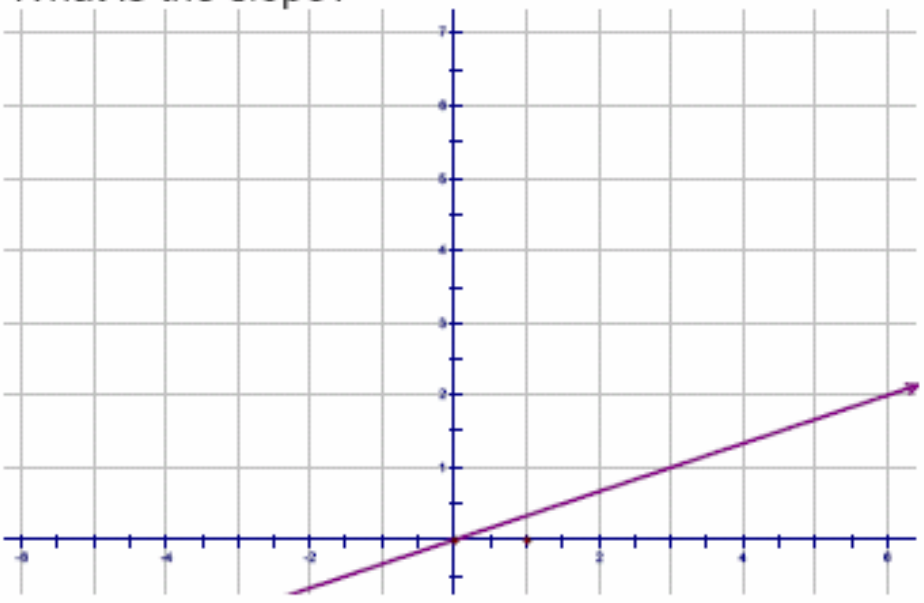
- What is the pattern?
- Pattern →
- What is the equation?

X	Y
-2	7
-1	4
0	1
1	-2
2	-5

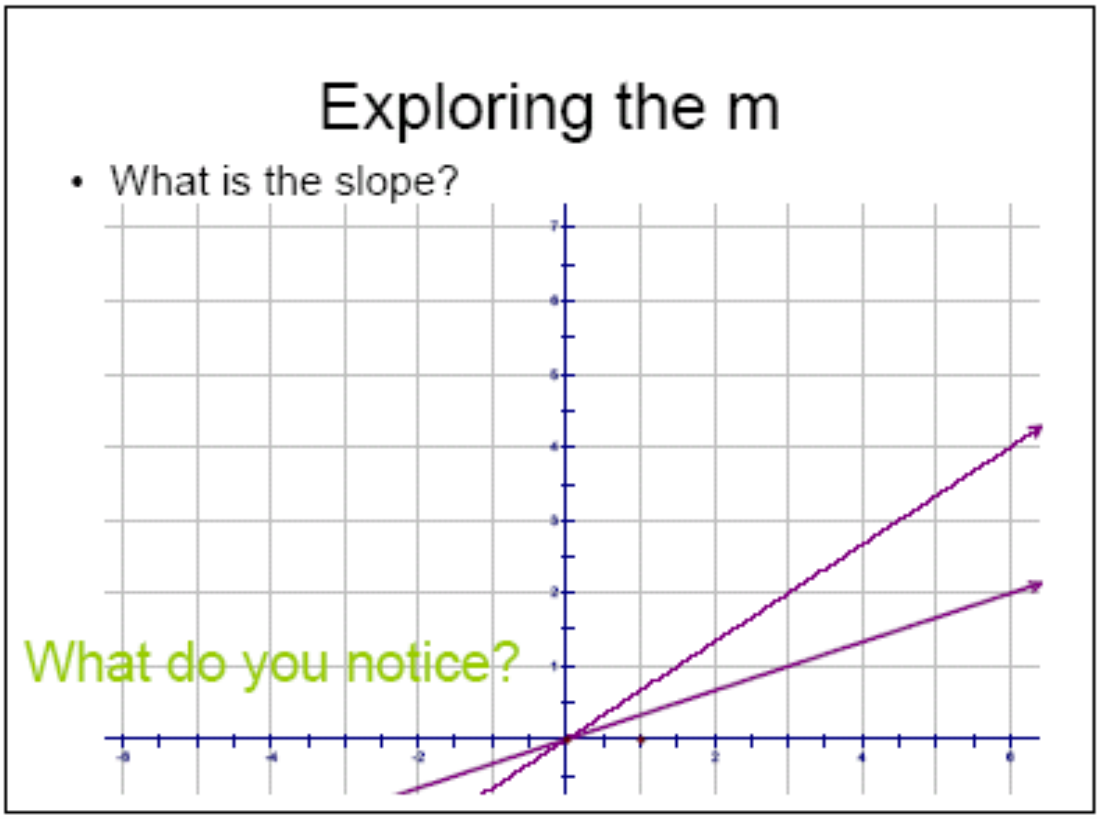
Equation →

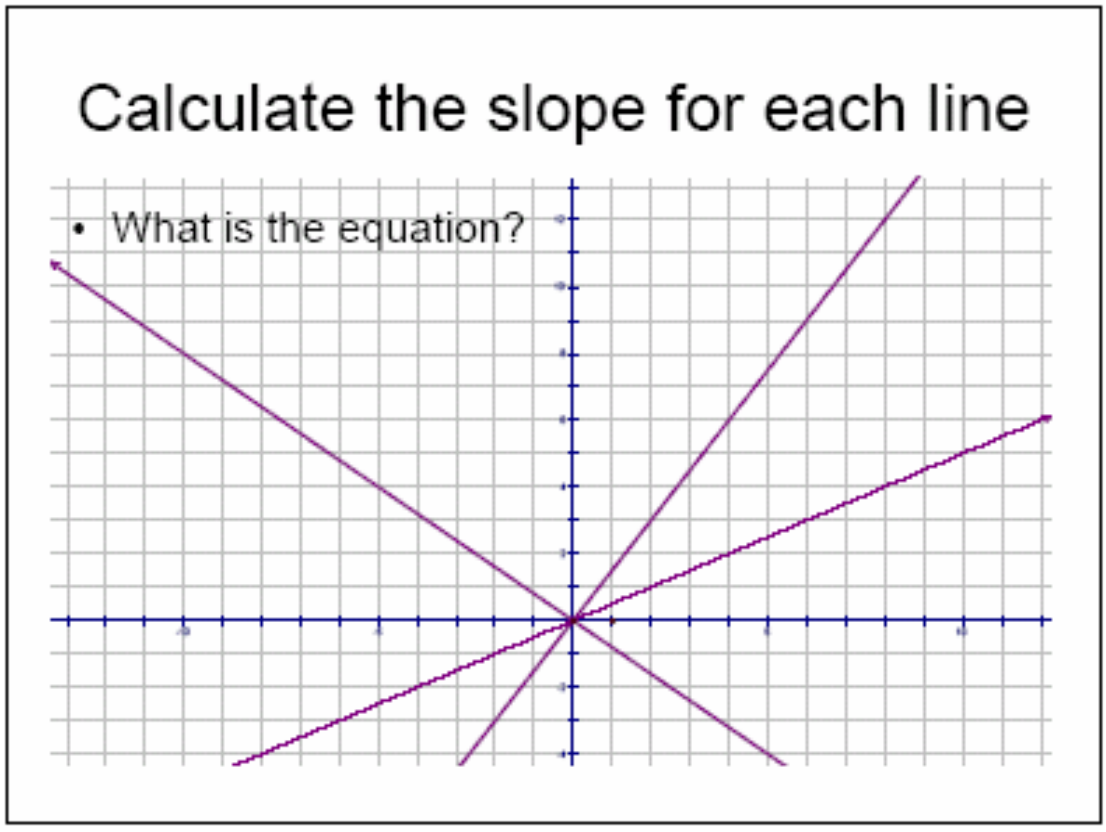
Exploring the m

- What is the slope?



3.2.2: Equation of a Line (Continued)





3.2.2: Equation of a Line (Continued)

What does the m represent?

What is the slope and what does the m represent?

$$y = \frac{3}{2}x$$

$$y = \frac{1}{5}x$$

$$y = \frac{-5}{2}x$$

Exploring the b

- Look at the table and look at the equation.
- What do you notice?
- When x = 0 →
- Equation has

X	Y
-2	4
-1	6
0	8
1	10
2	12

Equation →

Exploring the b

- Look at the table and look at the equation.
- What do you notice?
- When x = 0 →
- Equation has

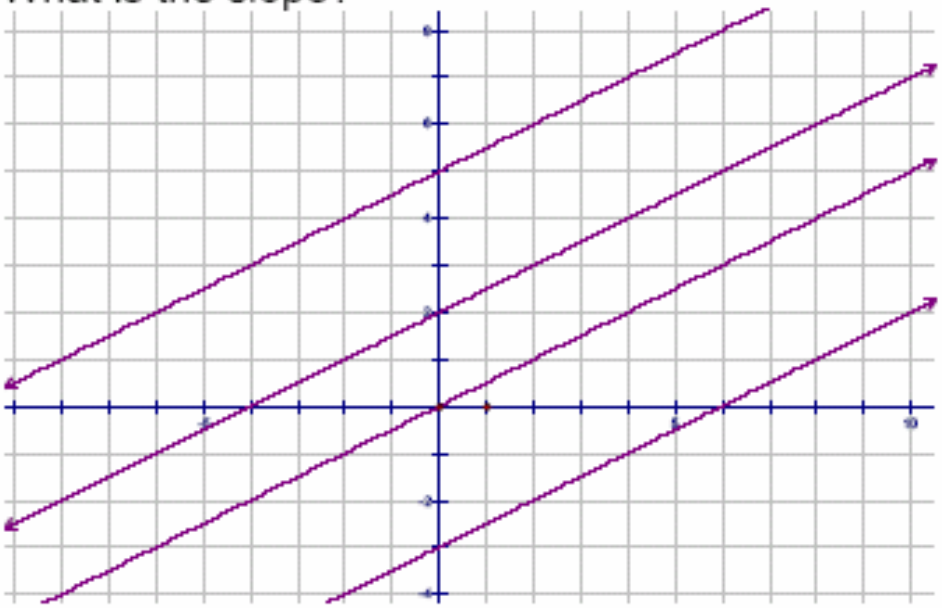
X	Y
-2	7
-1	4
0	1
1	-2
2	-5

Equation →

3.2.2: Equation of a Line (Continued)

Exploring the b

- What is the slope?



What does the b represent?

3.2.2: Equation of a Line (Continued)

What does the equation tell you?

- $y = 4x - 1$
- $y = {}^{3}/_{2}x + 2$
- $y = {}^{1}/_{5}x - 3$
- $y = -2x$
- $y = {}^{-5}/_{2}x + 10$

3.2.4: Equation of a Line

Complete the following table for each equation given. Provide a different context for each row if possible.

Equation	Slope	Real Context for Slope	y-intercept	Real context for y-intercept	Real context equation
Y = 2.5x + 5	2.5	$2.50/km	5	$5 starting fee	C = $2.50d + $5 (C represents cost and d represents distance a cab travels)
Y = 2x + 17					
y = 250 – 10x					
y = 1.5 + x					
y = 100x – 2000					
y = 75x					

3.3.1 Investigating Slope on the TI-83 Graphing Calculator

Note to teachers: the TRANSFRM program comes installed with TI-84+ Silver Edition calculators (and can be transferred via linking cables to student calculators); or can be downloaded for free from the TI website

Instructions for TI-83

Press **ON**
Press **APPS**
Scroll (using arrow buttons) and find **TRANSFRM**
Press **ENTER**
Select **UNINSTALL** by pressing **ENTER**
Press **APPS** again
Scroll and find **TRANSFRM**
Press **ENTER**
Now the screen should say "PRESS ANY KEY", so press any key to continue
Your screen will say DONE
Press **Y=** (grey button, white font, top left)

You now need to enter **AX+B.**
Do you see all the green letters on the calculator? You can get to them by pressing the **ALPHA** button (green button, white font)
So, to get A, you need to press **ALPHA**, then **MATH**. See?
X is the button to the right of the **ALPHA** button (the button with **X,T,Θ,n**)
The "+" sign you can find for sure and can you figure out how to type B?

So now you should have AX+B entered on the screen!
A few more steps and we're ready to graph.
Press **WINDOW**
Scroll up once so that **SETTINGS** is highlighted
Scroll down and change A to 1, change B to 1 and change Step to 1.
Ok, you're ready!

Press **GRAPH**!

Scroll right and left to see what happens to A.
If you want to play with B, scroll down once so that the equal sign for B is highlighted and then scroll right and left as well to change B.

You may need to press **WINDOW** again and adjust the settings to view your line.

Xmin (minimum value on x axis)
Xmax (maximum value on x axis)
Xscl (scale on x axis)
Ymin (minimum value on y axis)
Ymax (maximum value on y axis)
Yscl (scale on y axis)

Picture Source:http://education.ti.com/educationportal/sites/US/productCategory/us_graphing.html

3.3.2 Investigating Slope on the TI-83 Graphing Calculator

Worksheet for graphing calculator

1. Describe the graph when A is greater than 1.	Draw an example.
2. What is the difference between the graphs where A = 2 and A = 6?	Draw the graph when A = 2 (on the left) and when A = 6 (on the right).
3. Describe the graph when A = 0.	Draw an example.
4. Describe the graph when A is less than 0.	Draw an example.
5. What is the difference between the graphs where A = -2 and A = -6?	Draw the graph when A = -2 (on the left) and when A = -6 (on the right).

3.3.2 Slopes and Stuff on TI-83 Investigation
(continued)

6. When you are changing A, what stayed the same?	
7. What happens when B = 5?	Draw an example.
8. What happens when B = -6?	Draw an example.
9. When you are changing B, what stayed the same?	
10. In the equation y = mx + b, what does letter A represent? What about B?	

3.3.2 Slopes and Stuff on TI-83 Investigation
(continued)

Almost done. But since we're finished with the Transform applications, please help me uninstall it first before we move on.

Press **APPS**
Scroll and find **TRANSFRM**
Press **ENTER**
Select **UNINSTALL** by pressing **ENTER**

Using your equation that you got from your teacher, type this into your graphing calculator.

Press **Y=** and enter the equations (remember, X is the button with **X,T,Θ,n**).
Press **GRAPH**

You should see your graph on your screen. Walk around the room and find a line that looks parallel to yours from another student. If you want to see whether the lines are parallel, type the equation from the student you found into your calculator as well. Just repeat the above instructions and enter the second equation into $\mathbf{Y_2 =}$. Press **GRAPH** again.

Are they similar? If they are, compare the two equations. What is the same?

What can you conclude about parallel lines?

Check this by finding another pair of students and discuss your conclusions briefly with them.

Write down your conclusion below.

3.3.2a: Reviewing Characteristics of Linear Equations

Reviewing Slope and Y-intercept:

On your graphing calculator graph the following PAIRS of lines and write a statement comparing their slope and y-intercept. After you are finished with each pair, delete them before starting the next question.

	Pair of Lines to Graph (on TI-83 calculator)	**Compare Slopes** (e.g. parallel? perpendicular?)	**Compare Y-intercepts** (e.g. same or different?)
1)	$y = x + 1$ $y = x + 5$		
2)	$y = x + 1$ $y = x - 1$		
3)	$y = x$ $y = 3x$		
4)	$y = x$ $y = -x$		
5)	$y = 2x + 4$ $y = -x + 4$		

Summary:

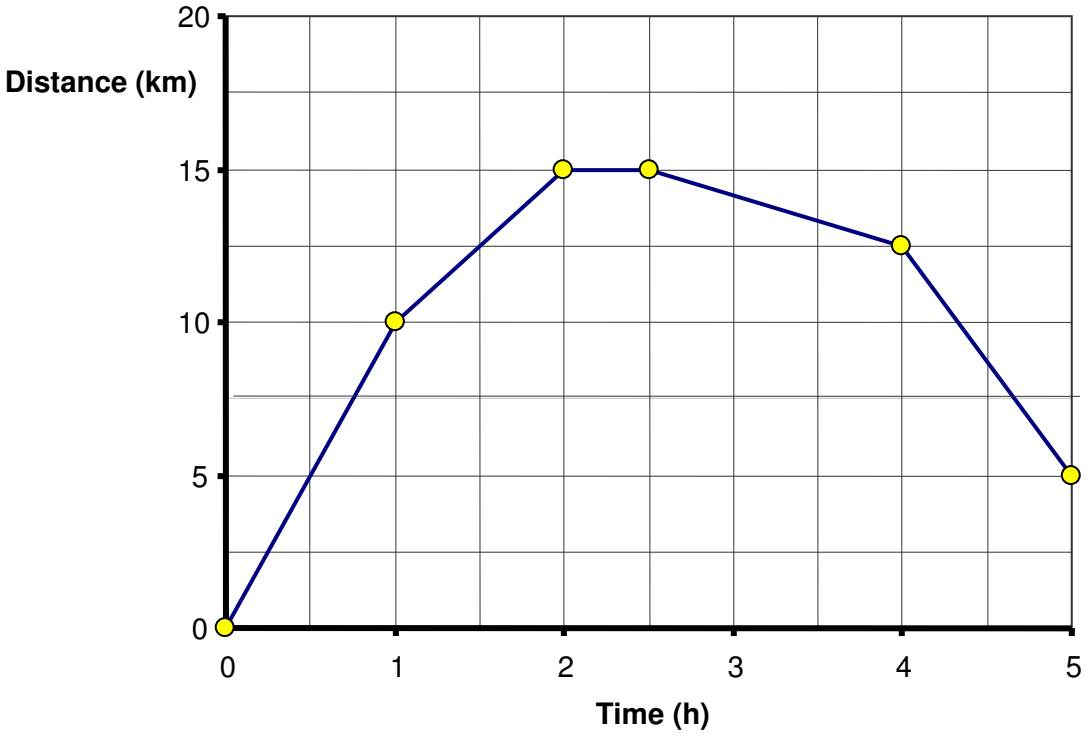
$$y = mx + b$$

State the slope and y-intercept for each equation:

Equation	Slope	y-Intercept
$y = 2x - 3$		
$y = -3x + 4$		
$y = 2 + 3x$		

3.3.6 Slopes and Stuff Homework

From the graph below, label each point with a name (A, B, etc.), name each slope, state whether the slope is positive or negative, calculate the slope and state any parallel slopes.



Slope: _____

Slope: _____

Slope: _____

Slope: _____

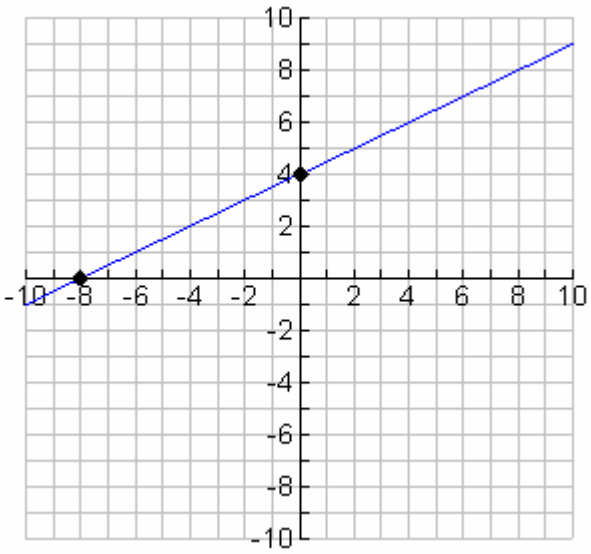
Slope: _____

Parallel slopes? _____

3.4.1 Graphs, Slopes, Intercepts, Equations and Check

One partner will find the y-intercept of each graph and the other partner will find the slope of each graph. You will both then create an equation that represents the graph. Finally, you will check your equation using the graphing calculator (use BLM 3.4.2 as a reference for your graphing calculator).

GRAPH A



Partner A

Slope = _____

Partner B

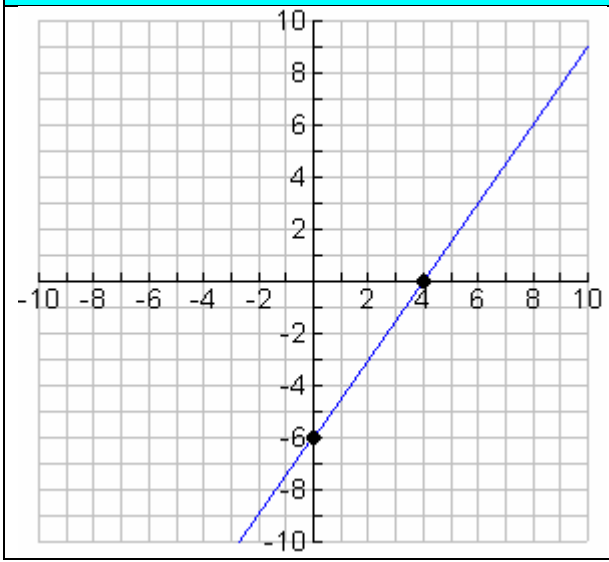
y-intercept = _____

Join both A and B to create an equation

Equation _____

Check you answer using the graphing calculator.

GRAPH B



Partner B

Slope = _____

Partner A

y-intercept = _____

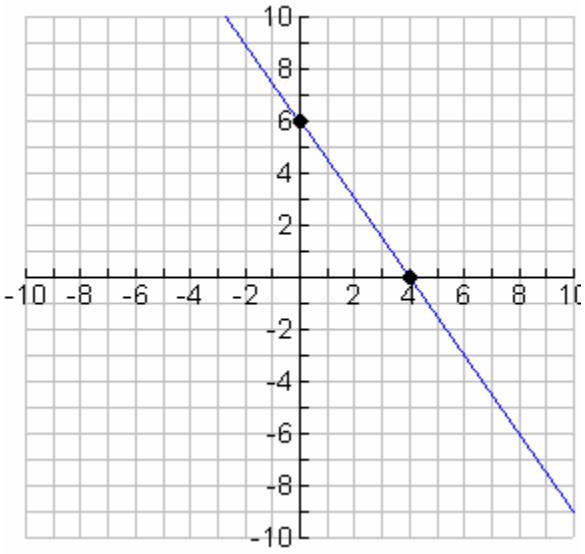
Join both A and B to create an equation

Equation _____

Check your answer using the graphing calculator.

3.4.1 Graphs, Slopes, Intercepts, Equations and Check (Continued)

GRAPH C



Partner A

Slope = _____

Partner B

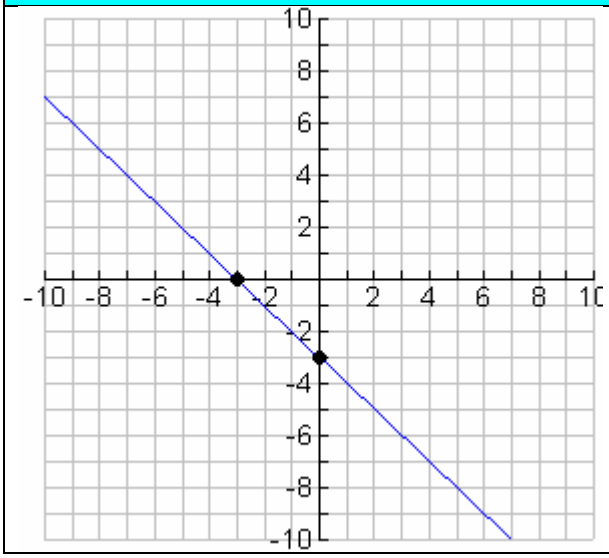
y-intercept = _____

Join both A and B to create an equation

Equation _____

Check your answer using the graphing calculator.

GRAPH D



Partner B

Slope = _____

Partner A

y-intercept = _____

Join both A and B to create an equation

Equation _____

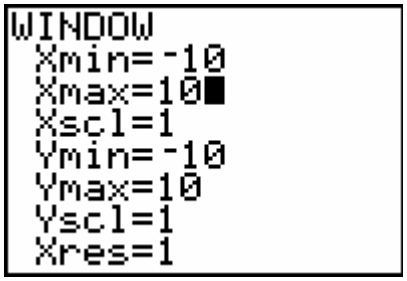
Check your answer using the graphing calculator.

3.4.2 Graphs, Slopes, Intercepts, Equations and Check: Graphing Calculator Keystrokes

1. Prepare your calculator resetting the graphing calculator.

   Press 2nd (yellow button), MEM (above the + key), scroll to RESET and press ENTER, scroll to DEFAULTS and press ENTER, scroll to RESET and press ENTER.

2. Press the WINDOW button and set the window setting as shown below:

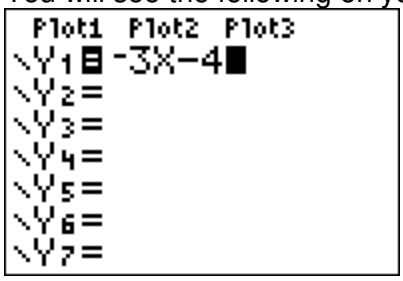


3. To enter an equation for graphing press the Y= button.

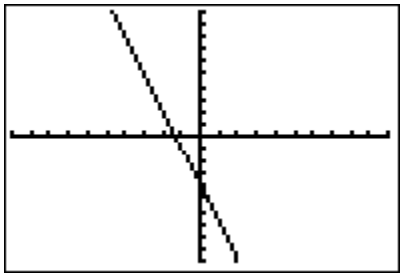
4. Enter your equation in Y1. For example, to graph y = -3x - 4 enter:

   (–) 3 X,T,Θ,n – 4

   You will see the following on your screen



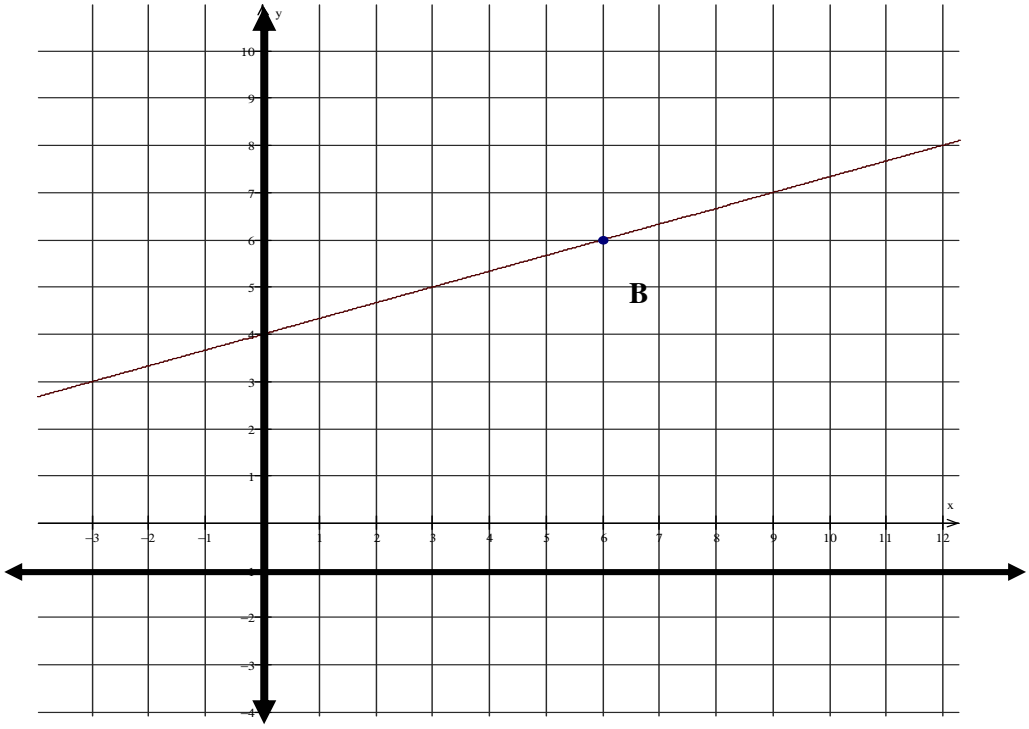
5. To view your graph press the GRAPH button. You will see the graph as shown below:



3.4.3 An Easier Way to Graph

Investigation 1

$$y = \frac{1}{3}x + 4$$



1. Start at the y-intercept.

2. Only moving up (+) or down (-), how many units do you need to reach the same level as point B?

   _____

3. Only moving right (+), how many units do you have to move your pencil to connect to point B?

   _____

4. Given the equation for the graph state the slope and the y-intercept

   Slope = _____

   y-intercept = _____

5. Describe how you can obtain the slope and y-intercept from the graph of a line, and use this information to write the equation of the line.

   _____

   _____

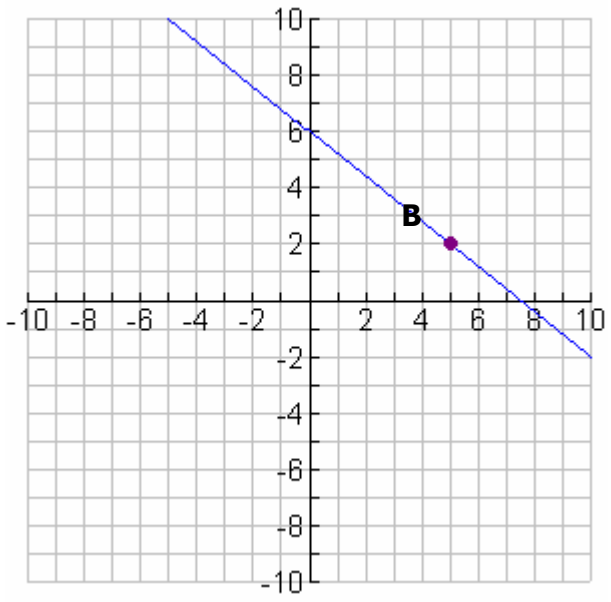
   _____

   _____

3.4.3 An Easier Way to Graph (Continued)

Investigation 2

$$y = -\frac{4}{5}x + 6$$



1. Start at the y-intercept.
2. Only moving up (+) or down (-), how many units do you need to reach the same level as point B?

   _____
3. Only moving right (+), how many units do you have to move your pencil to connect to point B?

   _____
4. Given the equation for the graph state the slope and the y-intercept

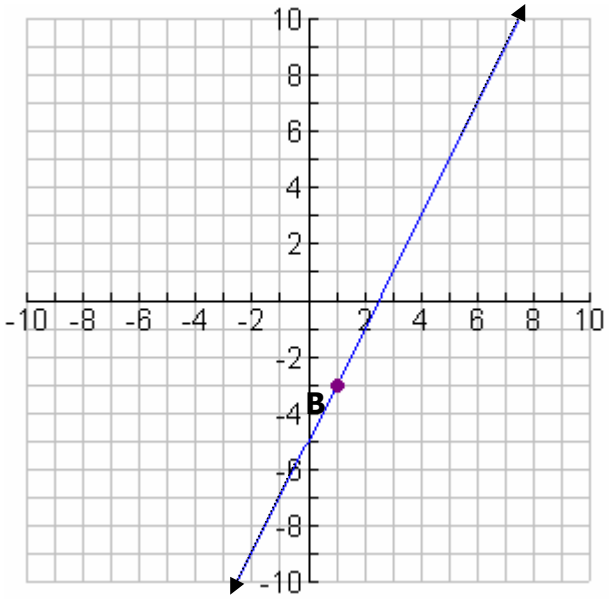
   Slope = _____

   y-intercept = _____

3.4.3 An Easier Way to Graph (Continued)

Investigation 3

$$y = 2x - 5$$



1. Start at the y-intercept.
2. Only moving up (+) or down (-), how many units do you need to reach the same level as point B?

   _____
3. Only moving right (+), how many units do you have to move your pencil to connect to point B?

   _____
4. Given the equation for the graph state the slope and the y-intercept

   Slope = _____

   y-intercept = _____

3.4.3 An Easier Way to Graph (Continued)

Summary

Discuss each question with your partner and both partners write answers.

1. Looking at all three investigations, can you relate the values from steps 2 and 3 with the slope or the y-intercept? Explain the relationship.

2. Given the following equation:

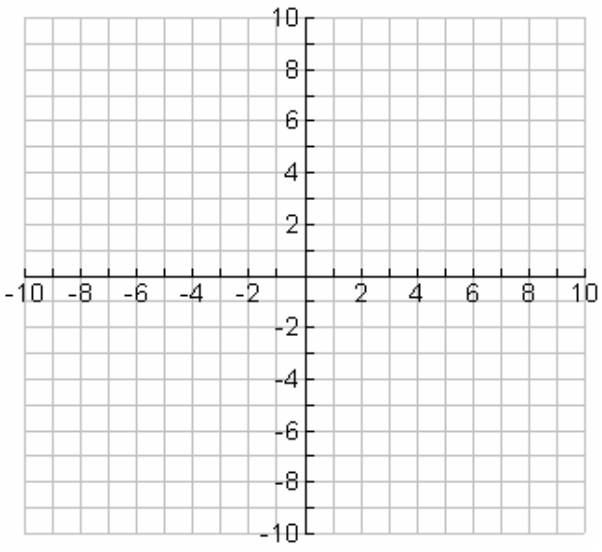
$$y = \frac{2}{3}x - 4$$

Slope: _____

y-intercept: _____

Describe a method to graph this equation by hand using the slope and the y-intercept.

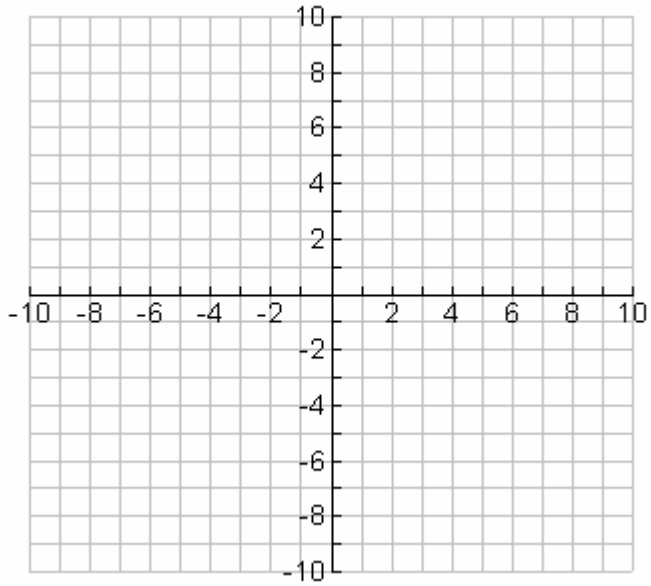
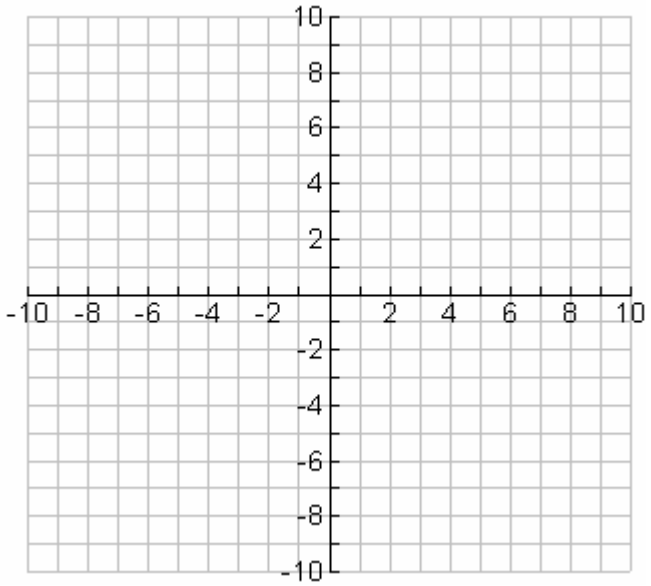
3. Using the grid provided below graph the equation $y = \frac{2}{3}x - 4$. Write the steps you followed to the right of your graph.



3.4.4 Rising and Running From a Point

Graph the following equations on the grids given below and check your graphs using the graphing calculator.

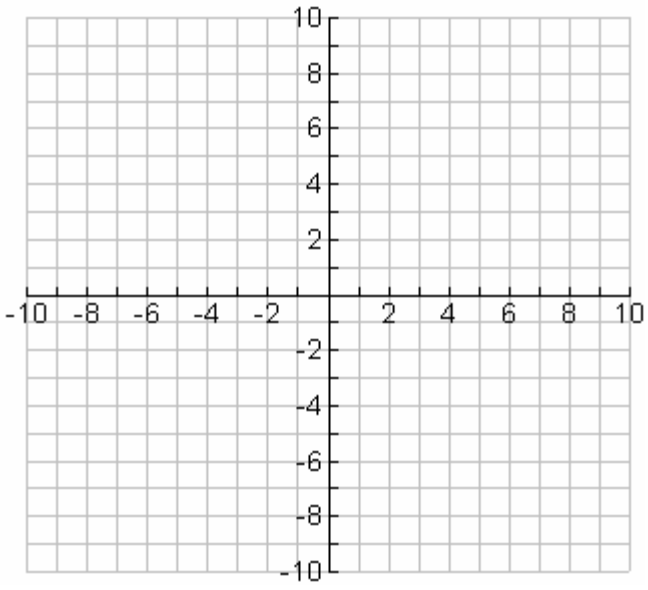
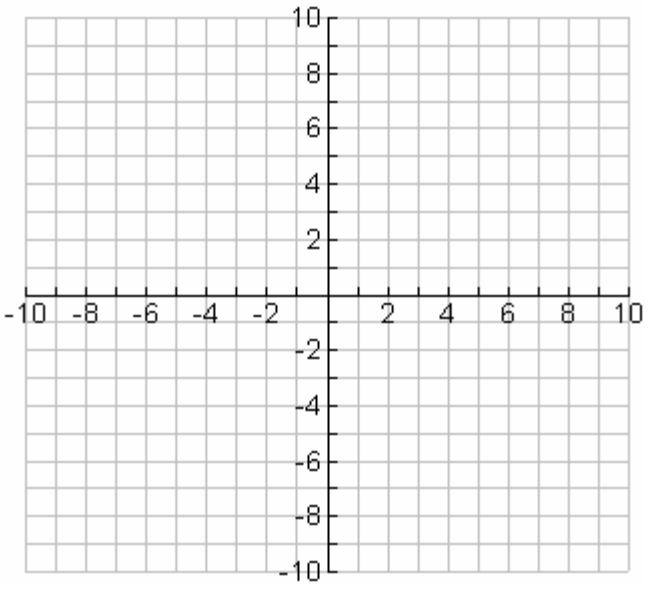
Note: When you write the slope as a fraction, any negative signs should be placed in the numerator only.

Equation 1	**Equation 2**
$y = 2x - 1$	$y = -\frac{4}{3}x + 2$
Slope = Rise = Run = y-intercept =	Slope = Rise = Run = y-intercept =
Graph: 	Graph: 
Describe how you graphed the line.	Describe how you graphed the line.

3.4.4 Rising and Running From a Point (Continued)

Graph the following equations on the grids given below and check your graphs using the graphing calculator.

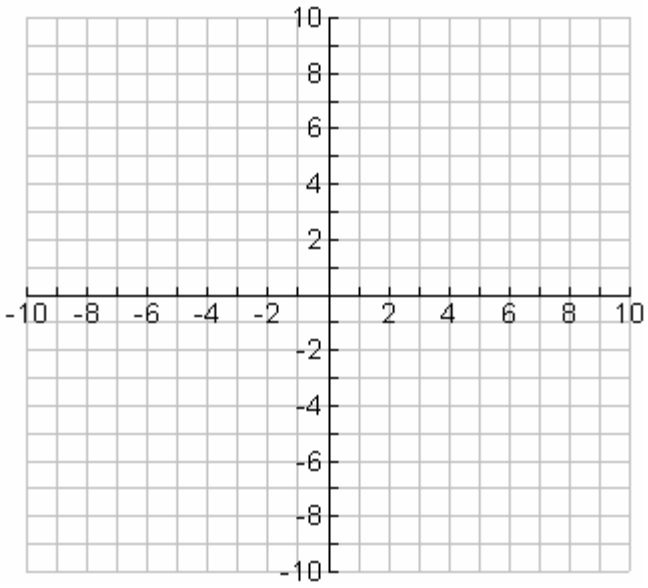
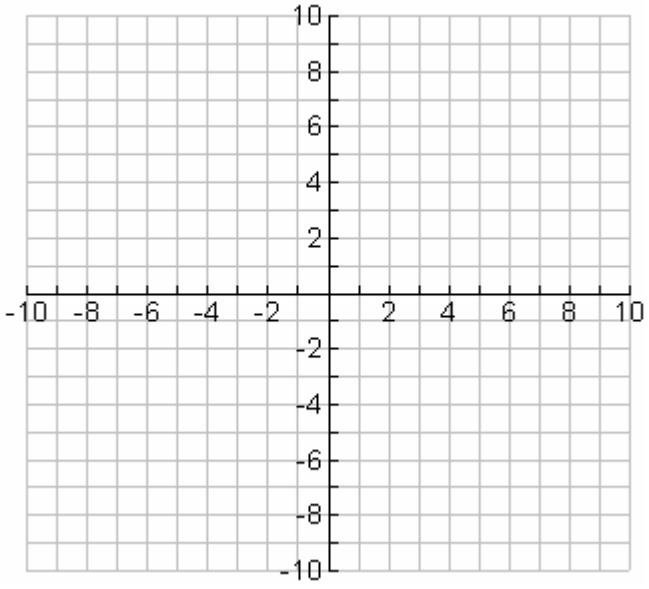
Note: When you write the slope as a fraction, any negative signs should be placed in the numerator only.

Equation 3	**Equation 4**
$y = 3x + 2$	$y = -x + 2$
Slope = Rise = Run = y-intercept =	Slope = Rise = Run = y-intercept =
Graph: 	Graph: 
Describe how you graphed the line.	

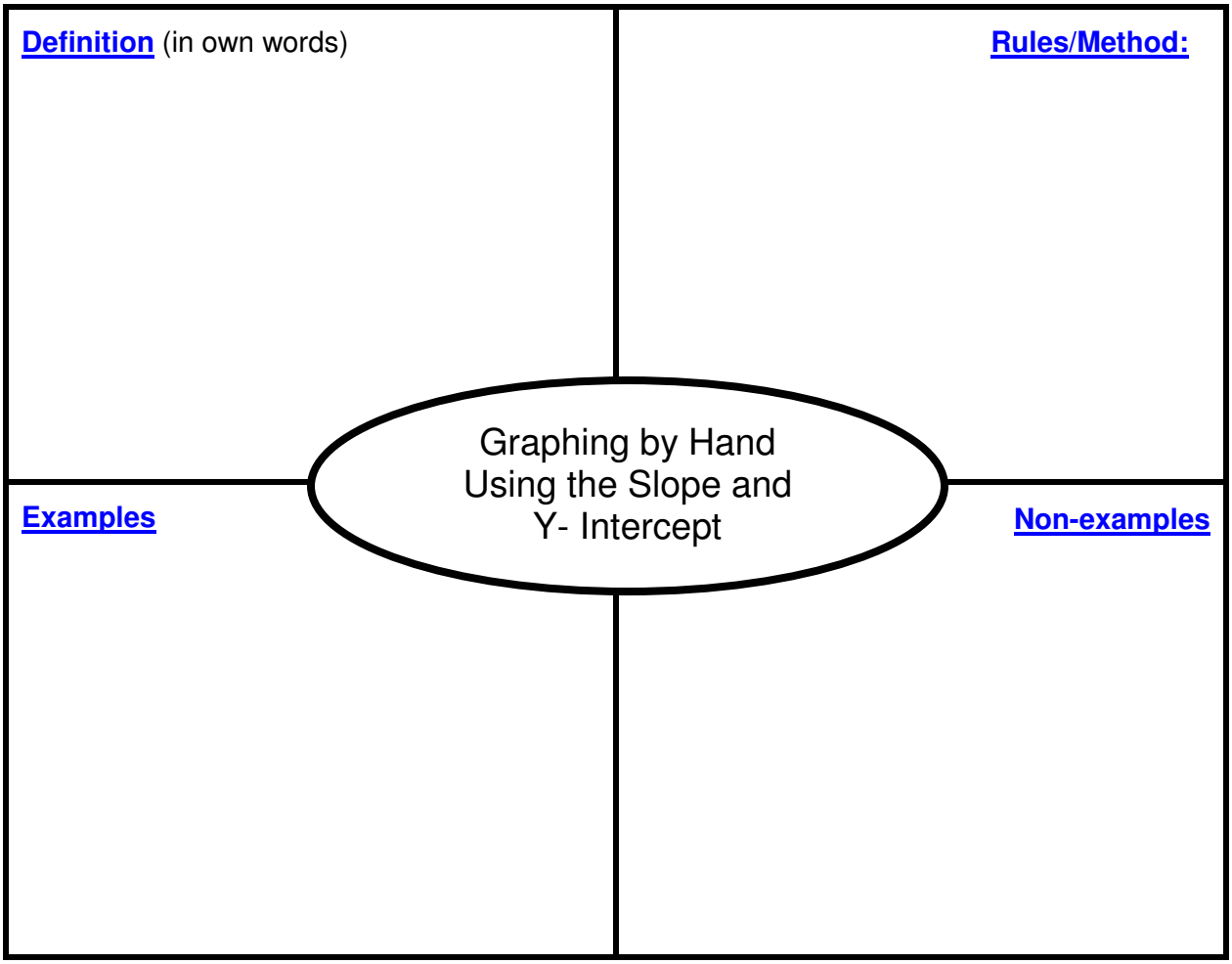
3.4.4 Rising and Running From a Point (Continued)

Graph the following equations on the grids given below and check your graphs using the graphing calculator.

Note: When you write the slope as a fraction, any negative signs should be placed in the numerator only.

Equation 5	**Equation 6**
$y = 2x$	$y = 3$
Slope = Rise = Run = y-intercept =	Slope = Rise = Run = y-intercept =
Graph: 	Graph: 
Describe how you graphed the line.	Describe how you graphed the line.

3.4.5: Graphic Organizer



3.5.1: Solving Equations With Fractions

1. Solve the following equations:

a) $\frac{x}{3} = 4$	b) $\frac{2}{5}x = 4$	c) $x - \frac{1}{2} = 3\frac{1}{2}$
d) $2x - \frac{9}{4} = \frac{3}{4}$	e) $\frac{30}{x} = 6$	f) $\frac{2}{3}x + \frac{2}{5} = \frac{12}{5}$
g) $\frac{5x}{3} - 4 = 6$	h) $\frac{1}{2}x - 5 = 11$	i) $\frac{4}{5} = \frac{2}{3}x + 6$ **Hint:** Multiply each term by the common denominator

3.5.1a: Solving Equations in Context

1. A cell phone company charges $0.40 per minute of use and no connection fee.

   a) Write an equation to model this situation for one month's bill (remember to define your variables!).

   b) How much would it cost to talk for 200 minutes per month?

   c) How many minutes were used if the bill was $82?

2. A different cell phone company charges $19.00 per month plus $0.25 per minute of use.

   a) Write an equation to model this situation for one month's bill (remember to define your variables!).

   b) How much would it cost to talk for 250 minutes per month?

   c) How many minutes were used if the bill was $72.25?

3.5.1a: Solving Equations in Context (continued)

3. A cell phone company offers you unlimited talking for $65.00 per month.

   a) Write an equation to model this situation for one month's bill (remember to define your variables!).

   b) How much would it cost to talk for 200 minutes per month?

   c) How much would it cost to talk for 350 minutes per month?

4. A gym membership costs a one-time fee of $99 plus $23 per month.

   a) Write an equation to model this situation (remember to define your variables!).

   b) How much would it cost to be a member for 2 years?

5. A tanning salon offers a by-the-minute package which costs $0.35 per minute. [1]

   a) Write an equation to model this situation (remember to define your variables!).

   b) If you had a budget of $20 per month for tanning, how many minutes could you tan?

[1] Continued use of a tanning bed or sunlamp can be quite dangerous, particularly during the teen-age years. Teens are at greater risk because they are still experiencing tremendous growth at the cellular level, and, like other cells in the body, the skin cells are dividing more rapidly than they do during adulthood." - Joshua L. Fox, M.D. (http://www.fda.gov/fdac/features/2005/205_tan.html)

3.6.2 Can You Stop The Fire?

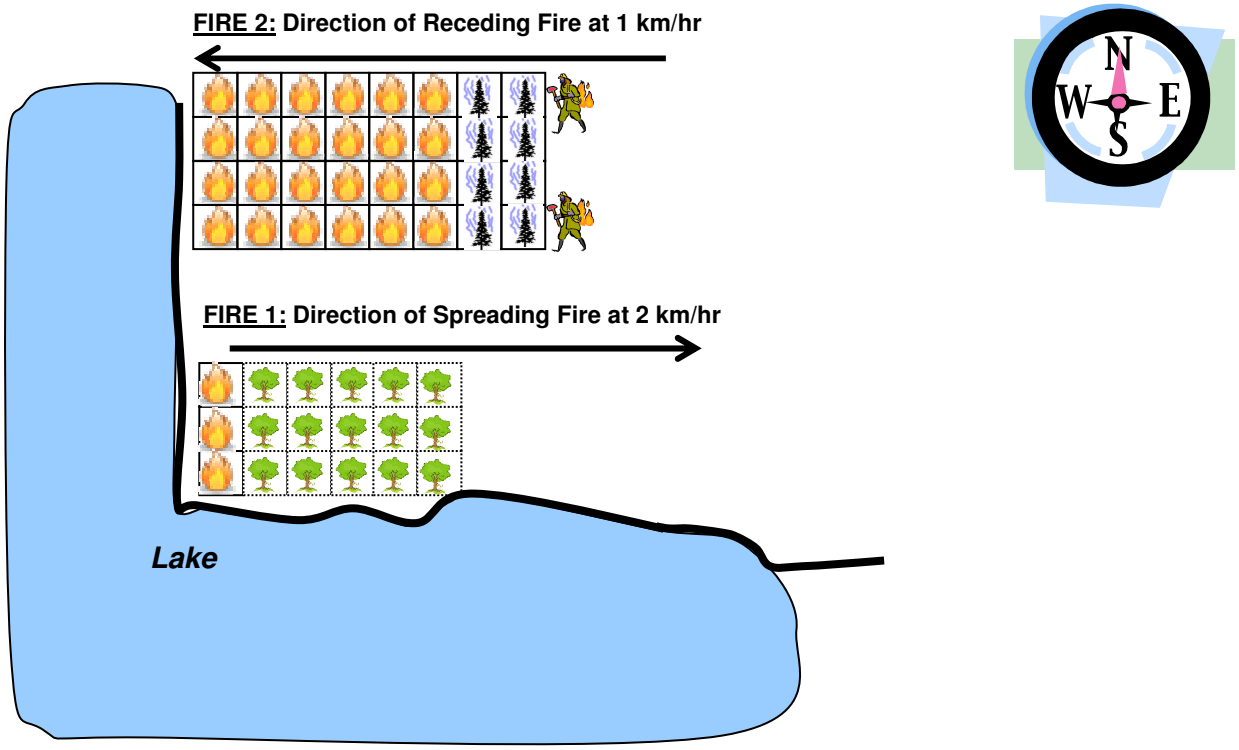
PROBLEM:

You work for the Ministry of Natural Resources as a Fire Fighting supervisor. You arrive in Dryden, Ontario where you find two fires burning.

- The first fire has just started along 3 km of shoreline beside a lake and is moving east at a rate of 2 km/hr.
- The second fire is also rectangular in shape and is being extinguished to the west by fire fighters at a rate of 1 km/hr.
- Both fires can only change east and west. They will not get wider or narrower.

The picture below shows how the fires looked at the moment you arrived.

Note: Each square = 1 km^2



3.6.2 Can You Stop The Fire? (Continued)

Questions:

1. Use the linking cubes to create models that represent the area of both fires at 0, 1, 2 and 3 hours. Each cube represents 1 km^2. Use different colours for the "contained fire" model and the "spreading fire" model.
2. Complete the tables below.

FIRE 1: The Spreading Fire			
Time	**h (km) (Height)**	**w (km) (Width)**	**A (km^2) (Area)**
0	3	1	
1	3		
2			
3			
4			
5			

FIRE 2: The Receding Fire			
Time	**h (km) (Height)**	**w (km) (Width)**	**A (km^2) (Area)**
0	4	7	
1	4		
2			
3			
4			
5			

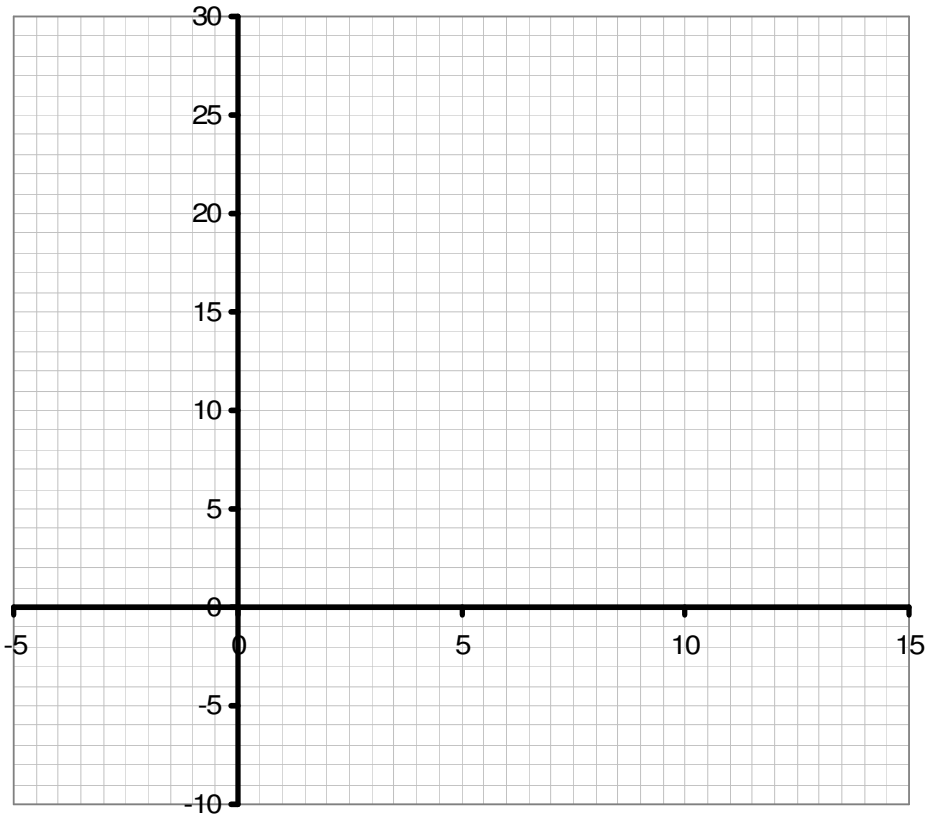
3. What variable is the x-variable (independent) (Circle one): **Time** or **Area**
4. What variable is the y-variable (dependent) (Circle one): **Time** or **Area**
5. What is the y-intercept (initial value) of both fires:

   a. y-intercept of Fire 1:_____

   b. y-intercept of Fire 2:_____

6. For both sets of data, graph the time vs. the Area of the fires on the grid on the next page and draw lines of best fit for each set of data. Use different colours for each line. Label both axes and each line.

3.6.2 Can You Stop The Fire? (Continued)



7. Using the graphs, or the tables, determine the slope (rate of change) of both fires.

   a. Slope of Fire 1:_____

   b. Slope of Fire 2:_____

8. Using the graphs, what is the area of the fires at 6 hours?

   a. Area of Fire 1:_____

   b. Area of Fire 2:_____

3.6.2 Can You Stop The Fire? (Continued)

9. Using the values of the slopes and y-intercepts, write an equation of both fires in the form of **y = mx + b**:

   a. Equation of Fire 1:_____

   b. Equation of Fire 2:_____

10. Using the regression function of the graphing calculator, check to see if your equations are correct.
     (See 3.6.3 for details.)
11. Using the graphing calculator, check to see if your graphs are correct by graphing both equations.
     (See 3.6.3 for details.)
12. Using the equations, find the areas of both fires at 6 hours. Compare your answers to the answers from question 9.

    Show work for Fire 1

    Area of Fire 1 at 6 hours: _____

    Show work for Fire 2

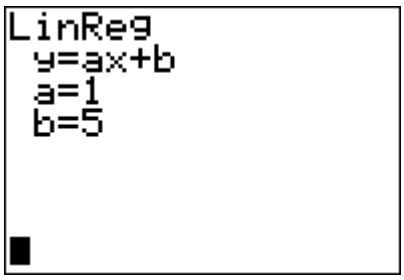
    Area of Fire 1 at 6 hours: _____
13. Looking at both graphs, do the lines ever meet? (Circle one) **Yes** or **No**
14. If the lines meet, at what time and area does it occur?
    a. Time: _____
    b. Area of Fire:_____
15. Explain the significance of this point in this context.

3.6.3 Can The Graphing Calculator Stop the Fire?

Determining the Equation of a Line

1. Prepare your calculator by either running a get-ready program or resetting the graphing calculator.
2. Enter the data into the list of the calculator be pressing STAT 1. Enter the time for into **L1** and the area of the fire into **L2**
3. Once all the data has been entered the calculator will perform linear regression to determine the equation of the line of best fit.
4. To determine the equation for the line of best fit press STAT ▶ 4
5. Press 2nd 1 , 2nd 2 to state the two lists to use. Your screen will look like:

6. Now press ENTER to generate the equation. Your screen will show results similar but with different values as below:



Note: **a** represents the slope.

7. In this case your equation would be: y = 1x + 5 or y = x + 5

3.6.3 Can The Graphing Calculator Stop the Fire? (Continued)

Determining the Equation of a Line

8. To view the graph of the data and graph you must first enter the equation of the line in Y1 by pressing 

9. Next enter the equation from above into Y1: 

for y = x + 5

10. Change the window settings as illustrated below be pressing 


```
WINDOW
 Xmin=-5
 Xmax=15
 Xscl=1
 Ymin=-10
 Ymax=30
 Yscl=1
 Xres=1
```

11. Now to view the graph press 

12. Compare with the graph you made earlier by hand. If they are different check for errors.

3.6.4 Modelling Problems Algebraically

Piggy Bank Math

Little Johnny has three dollars to put into his brand new piggy bank. He will deposit his entire two-dollar per week allowance into his piggy bank.

a) Create a table that shows how much little Johnny will have over the first three weeks.

Weeks	Balance
0 (today)	3
1	
2	
3	

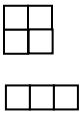
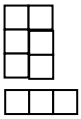
b) Create an equation in the form of y = mx + b from the data above.

c) He wants to buy a pet fish that he will name "Ernie" by Christmas, that is, in 9 weeks. Will he have enough money to buy Ernie if he costs $23

d) Little Johnny is also considering saving up for a new bike that costs $127. If he does not buy the fish, how long will it take until he has saved up enough to buy the bike?

Patterns in Area

Consider the following patterns created with unit cubes

Shape #	Picture	Total Area
1		
2		
3		
4		

a) Fill in the picture of 4th shape.

b) Fill in the Total Area Column

c) Create an equation in the form of y = mx + b from the data above.

d) Using your equation, what will the area of 12th figure be? Show your work.

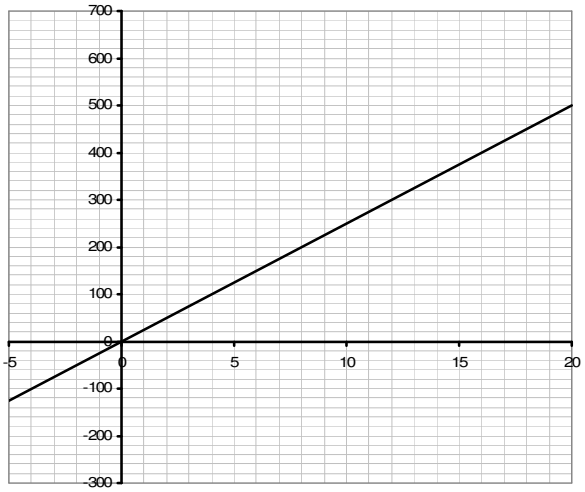
e) How many shapes would you have to build to have 139 cubes? Explain.

3.6.4 Modelling Problems Algebraically (Continued)

The Mechanic Problem

A mechanic earns $25 per hour

a) The graph below illustrates hours worked versus earnings.



b) Label the axis in the graph above.

c) Create an equation in the form of y = mx + b from the data above.

d) How much will the mechanic earn after 40 hours

e) How many hours must the mechanic work if she earns $1240?

Patterns in Area

Consider the following patterns created with unit cubes

Shape #	Picture	Total Area
1		
2		
3		
4		

a) Build the first, second, third and fourth shapes with the cubes. Fill in the picture of the 4th shape.

b) Fill in the Total Area Column

c) Create an equation in the form of y = mx + b from the data above.

d) What will the area of 7th figure be? Show your work.

e) Can you build the 8th figure? Explain.

3.6.6 Practicing Models

Part A: Complete the following table

#	Context	Equation in: y = mx + b	Problem
1	A caterer charges a flat fee of $400 plus $15/person.		Find the cost after 30 people
2	An internet package charges a flat fee of $10 plus $0.40 per hour.		Find the number of hours of internet usage if the cost is $200.
3	The temperature of hot water placed in the freezer is 80° C and it is decreasing at the rate of 8° C per hour.		Find the temperature after 13 hours.
4	A tree`s diameter grows by 1¾ cm per year. The tree`s diameter is currently 12 cm.		Find how many years it will take have diameter 20¾ cm.
5	A spring is 14 cm long with no mass on it and it grows by 3 cm per kg put on it.		Find how much weight was added if the spring is 35 cm long.

Part B: For each equation, create a real world context. Identify the independent variable (**x**) and dependent variable (**y**) for each.

1. y = 15x _____

_____

2. y = 0.05x + 25 _____

_____

3. y = 20x – 100 _____

_____

3.6.6a: Driving Lessons

Jason just turned 16 and wants to get his driver's license as fast as possible. His parents, however, are insisting that he take "Driver's Ed" to lower the insurance premium and are willing to pay the lesson cost of $40 per hour.

a) Complete the table of values for the total cost in dollars for up to 8 hours in driving lessons:

b) Explain how you determined the *y* values (e.g. show your work for two values).

t (hours)	*C* ($)
0	
1	
2	
3	
4	
5	
6	
7	
8	

c) Use the table of values to estimate the number of hours of driving for a total cost of $150.

d) What is the slope of this linear relation? What does it mean in this problem?

e) What is the y-intercept (or C-intercept) of this linear relation? What does it mean in this problem?

f) State the equation of the line that models this situation.

g) When might it be helpful to know the equation?

3.7.1 Y the X Are You Intercepting Me?

On the grid paper on the next page plot and label all the points listed below.
(**Note**: Each point is labelled so you can refer to them later.)

A(3,3)	B(2,3)	C(1,3)	D(0,3)	E(-1,3)	F(-2,3)
G(-3,3)	H(3,2)	I(3,1)	J(3,0)	K(3,-1)	L(3,-2)
M(3,-3)	N(-3,2)	O(-3,1)	P(-3,0)	Q(-3,-1)	R(-3,-2)
S(-3,-3)	T(2,-3)	U(1,-3)	V(0,-3)	W(-1,-3)	X(-2,-3)

Now, read the following carefully. There are three columns given: starting point, ending point and slope.

- If you have the starting point and slope, you have to state the ending point.
- If you have the ending point and slope, you have to state the starting point.
- If you have the starting point and ending point, you have to state the slope.

Starting Point	Ending Point	Slope
G		-1/6
F		-2/5
E	J	
O		-4/3
	X	-6
Q	T	
B	M	
D	K	
N		-5/2
R	M	
C		-5/2
P	U	
G	A	
S	M	
G	S	
A	M	

Making the picture:
Connect each starting point to each ending point.
What type of shape is created?

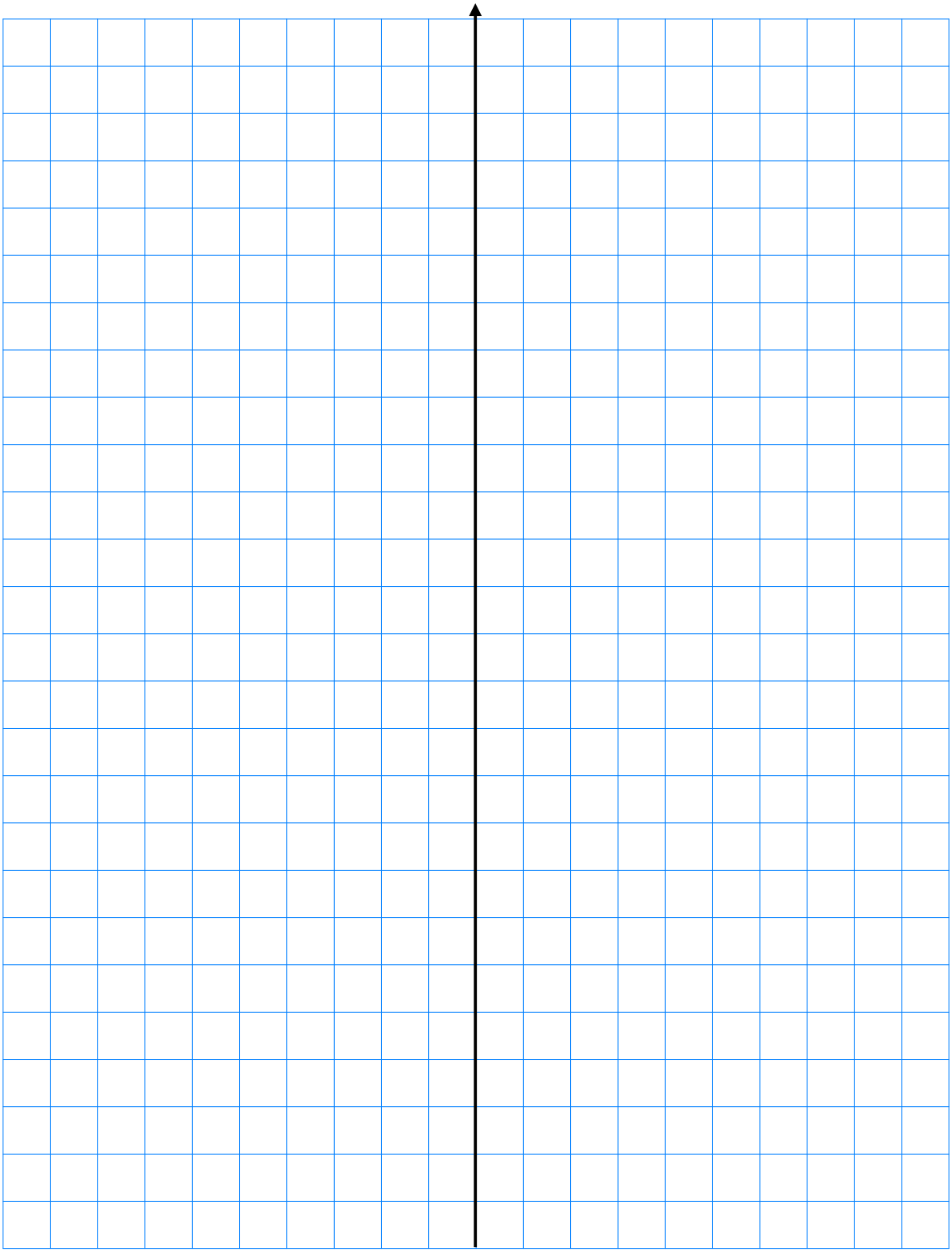
State the y-intercepts:

_____

State the x-intercepts:

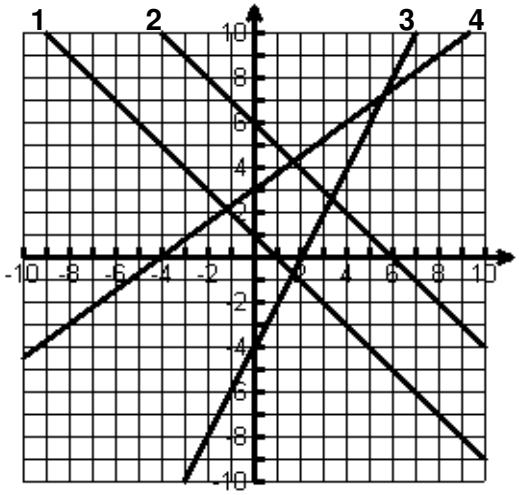
_____

3.7.1 Y the X Are You Intercepting Me? (Continued)



3.7.3 Y the X Are You Intercepting Me - Practice

Answer the following questions based on the lines graphed below.



1. Which lines have positive slopes?

2. Which lines have negative slopes?

3. Fill in the table by listing the coordinates for the x-intercepts and y-intercepts.

Line	*x*-intercepts	*y*-intercepts
1		
2		(0, 6)
3		
4	(-4, 0)	

4. Write the equation for line #1.

5. Write the equation for line #2.

6. Write the equation for line #3.

7. Write the equation for line #4.

3.7.3 Y the X Are You Intercepting Me - Practice (Continued)

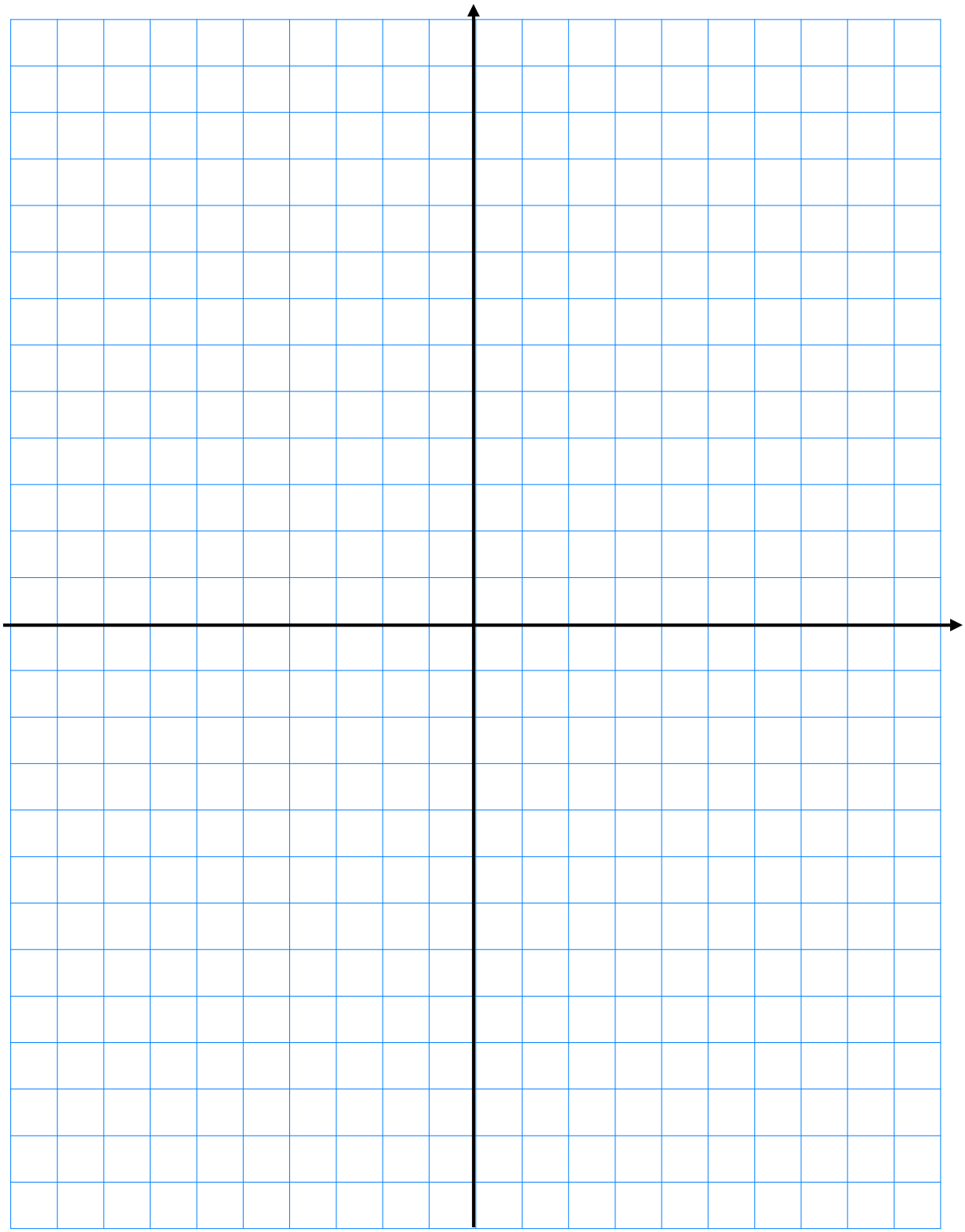
8. Calculate the x and y-intercepts and graph each line on the graph paper on the next page.
   a) $3x - 2y - 6 = 0$

   b) $5x + 2y - 10 = 0$

   c) $3x - y - 9 = 0$

   d) $2x - 5y - 14 = 0$

3.7.3 Y the X Are You Intercepting Me - Practice (Continued)



3.8.1 Writing Equations of Lines

Working with Another Form

Some Review

1. What is the slope and y-intercept for each line?

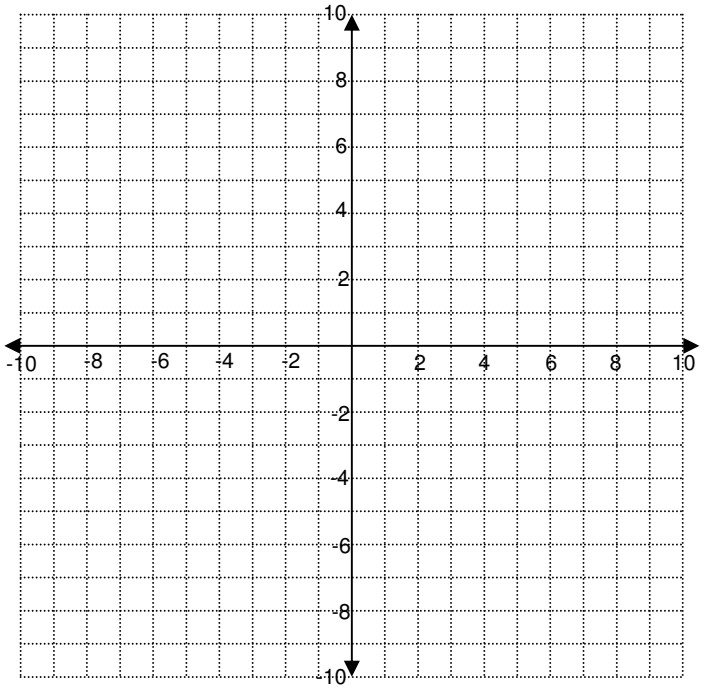
   a) y = -3x + 1

   m = _____ b = _____

   b) $y = \frac{3}{4}x - 3$

   m = _____ b = _____

2. Using this information, graph each of the equations on the grid below. Use a different colour for each line and label each line.



3. Let's look at another two equations.

   a) 3x + y – 1 = 0

   b) 3x – 4y – 12 = 0

What are two things you notice are different about these equations when you compare them to the equations in #1?

REMINDER:
You can only read the slope and y-intercept from the equation of a line if it is in ***y = mx + b*** form.

3.8.1 Writing Equations of Lines (Continued)

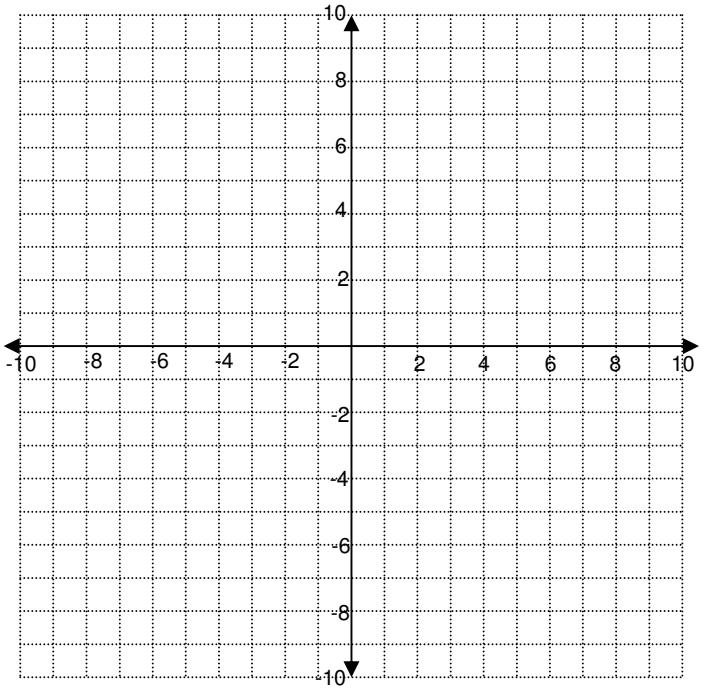
4. Calculate the x-intercept and the y-intercept. Then graph the equations on the grid below. Use a different colour for each line and label each line.

   a) $3x + y - 1 = 0$ b) $3x - 4y - 12 = 0$

Practice:

5. For each equation:
   - Calculate the x-intercept and the y-intercept.
   - Graph on the grid provided. Use a different colour for each line and label each line.

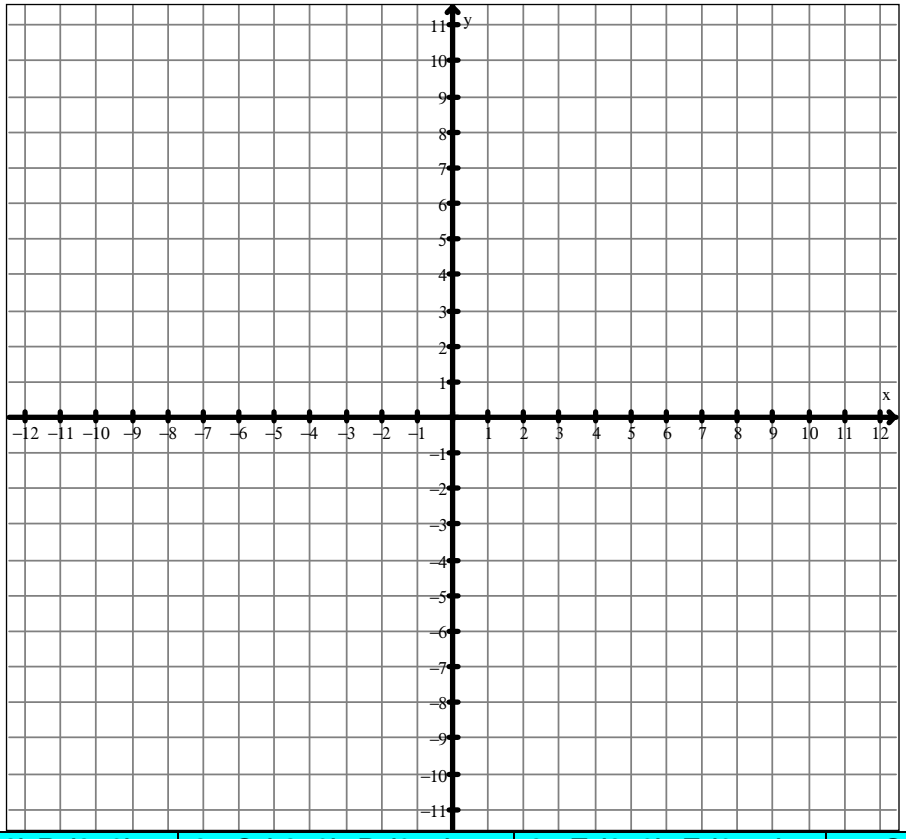
   a) $2x + y - 4 = 0$ b) $4x + 2y + 6 = 0$



3.8.2: Jack and Jill Go up a Hill

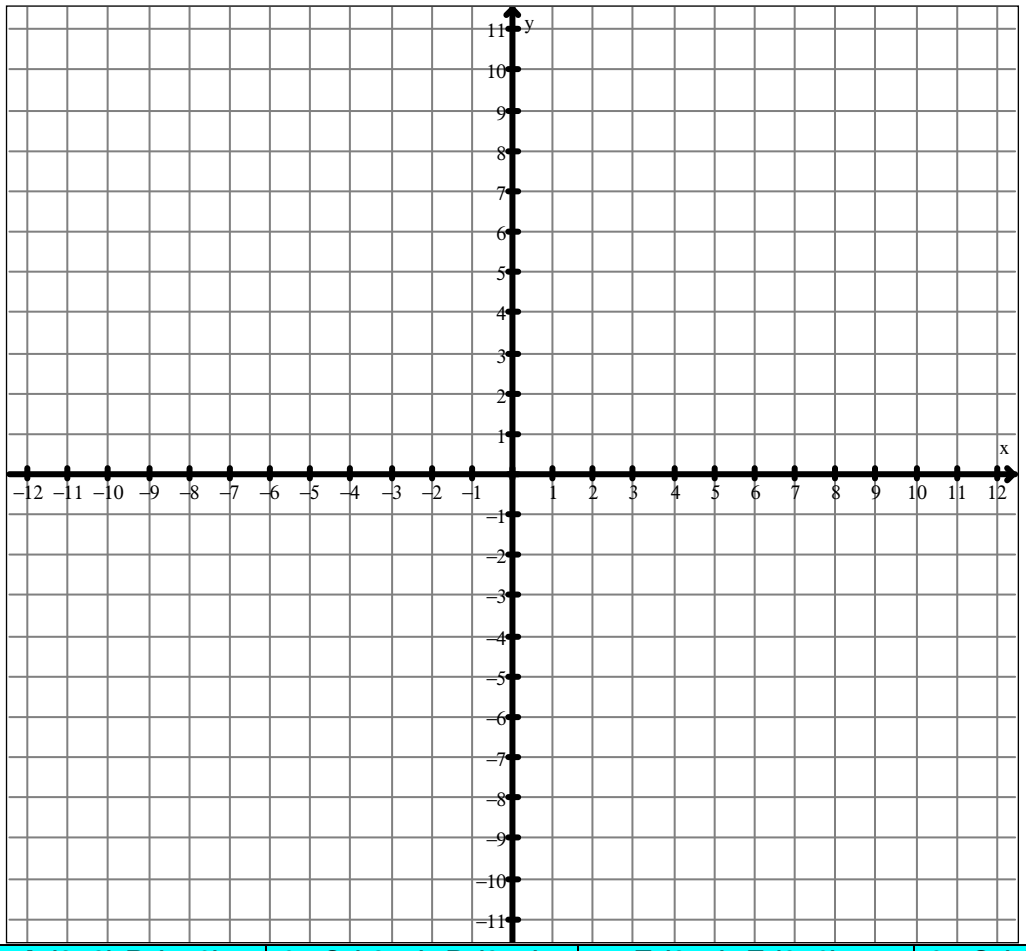
For each of the following questions

a) Plot the points on the given grid.
b) Draw a line connecting the points
c) Calculate the rise by counting squares. Calculate the rise again by using the coordinates of the points. Show your work to confirm your answers. (The first one is done for you).
d) Calculate the run by counting squares. Calculate the run again by using the coordinates of the points. Show your work to confirm your answers.
e) Calculate the slope. (rate of change)



1. A (0, 3) B (2, 0)	2. C (-2, 0) D (0, 5)	3. E (3, 0) F (0, -7)	4. G (0, 0) H (7, 0)
Rise: Run: $Slope = \frac{Rise}{Run}$	Rise: Run: $Slope = \frac{Rise}{Run}$	Rise: Run: $Slope = \frac{Rise}{Run}$	Rise: Run: $Slope = \frac{Rise}{Run}$

3.8.2: Jack and Jill go up a Hill (Continued)



Reminder: Vertical lines do not have a slope. The slope is undefined.

5. A (2, 3) B (5, 0)	6. C (-2, 1) D (3, 5)	7. E (2, 1) F (3, 6)	8. G (-3,-3) H (-3, 7)
Rise: Run: $Slope = \frac{Rise}{Run}$	Rise: Run: $Slope = \frac{Rise}{Run}$	Rise: Run: $Slope = \frac{Rise}{Run}$	Rise: Run: $Slope = \frac{Rise}{Run}$

Describe in your own words how you would calculate the slope of a line given two points without using a graph.

3.8.3: Determining Slope given 2 Points

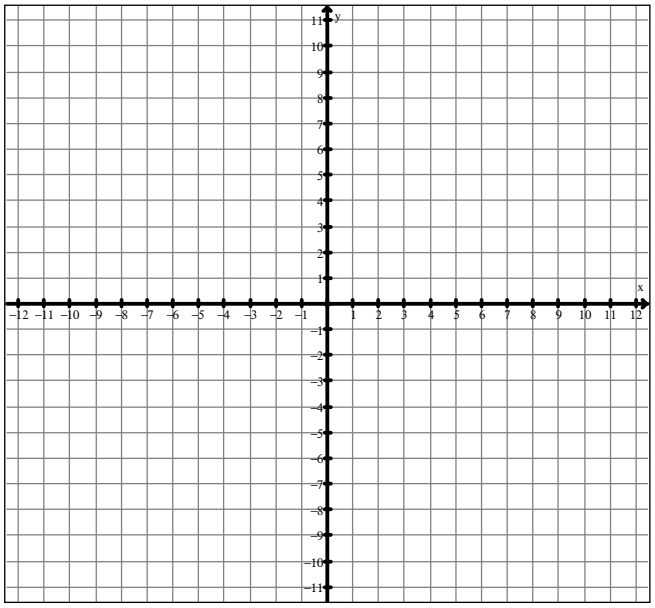
Determine the slope of the line given by each of the following pairs of points.

A Coaches B	B Coaches A
9. A (25, 30) B (35, 20)	**10. E (-13, -23) F (31, 17)**
$Slope = \frac{Rise}{Run}$	$Slope = \frac{Rise}{Run}$
11. G (32, 21) H (-3, -16)	**12. A (7, 40) B (11, 81)**
$Slope = \frac{Rise}{Run}$	$Slope = \frac{Rise}{Run}$
13. E (3, 33) F (2, 27)	**14. G (-200, -100) H (30, -6)**
$Slope = \frac{Rise}{Run}$	$Slope = \frac{Rise}{Run}$
15. E (-12, -15) F (-20, -4)	**16. E (5, -6) F (15, 8)**
$Slope = \frac{Rise}{Run}$	$Slope = \frac{Rise}{Run}$

3.8.4: Writing Equations of Lines

For each of the following questions:

1. Plot the points on the given grid.
2. Draw a line connecting the points and extend the line in both directions to the edge of the graph.
3. Calculate the slope (rate of change) using a formula. Compare your answer with your graph.
4. Using the graph state the y-intercept.
5. Write the equation of the line in slope y-intercept form.
6. Verify your equation using a graphing calculator.

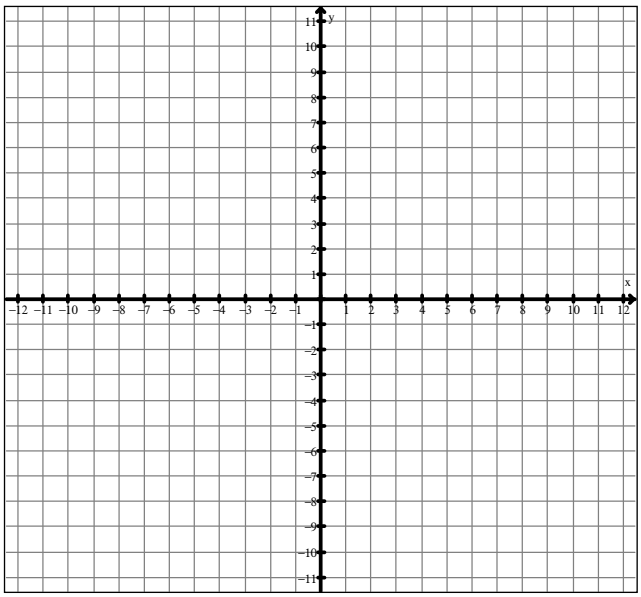


1. A (0, 8) B (8, 0)

$$Slope = \frac{Rise}{Run}$$

y-intercept =

Equation:



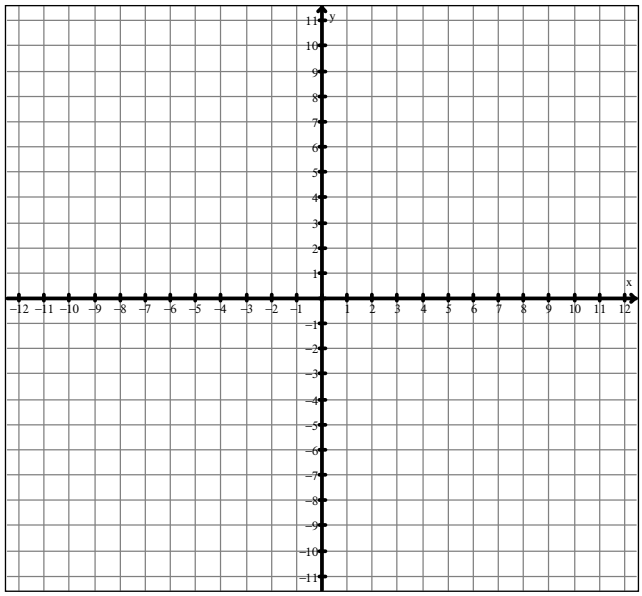
2. A (2, 4) B (4, 5)

$$Slope = \frac{Rise}{Run}$$

y-intercept =

Equation:

3.8.4: Writing Equations of Lines (Continued)

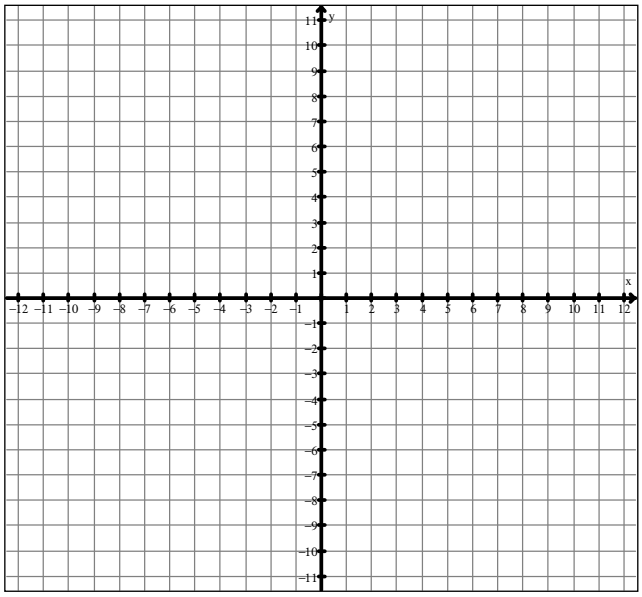


3. A (-2, -2) B (2, 10)

$$Slope = \frac{Rise}{Run}$$

y-intercept =

Equation:



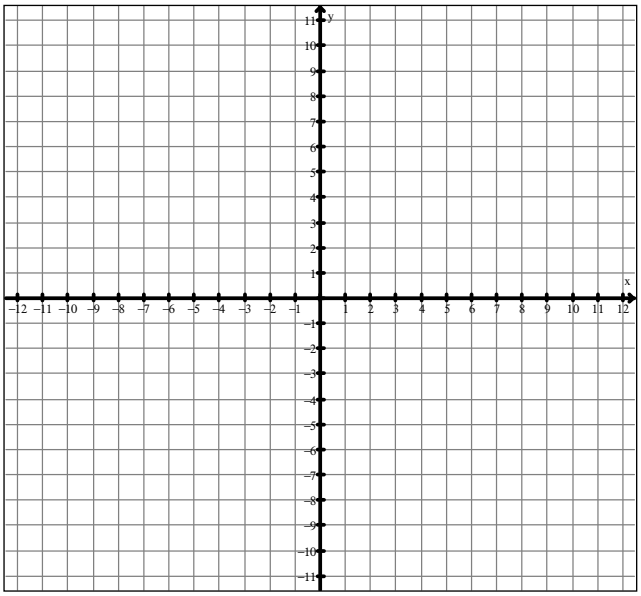
4. A (4, -6) B (12, 0)

$$Slope = \frac{Rise}{Run}$$

y-intercept =

Equation:

3.8.4 Writing Equations of Lines (Continued)

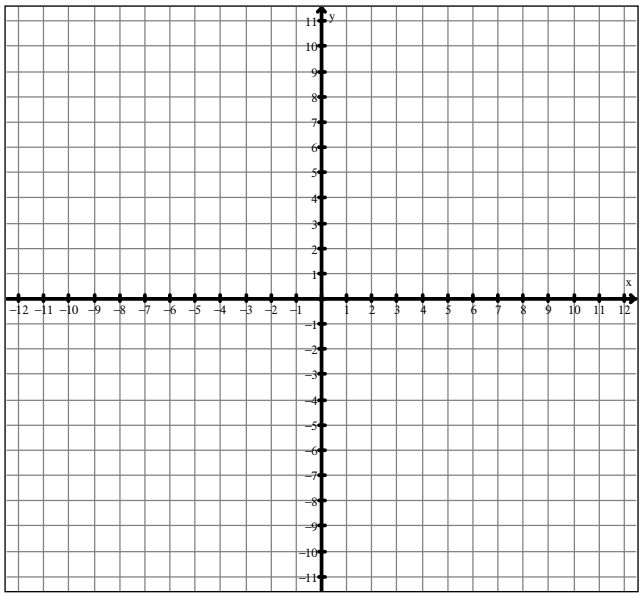


5. A (-6, 4) B (5, 4)

$$Slope = \frac{Rise}{Run}$$

y-intercept =

Equation:



6. A (-6, 1) B (12, 4)

$$Slope = \frac{Rise}{Run}$$

y-intercept =

Equation:

3.9.2 Writing Equations

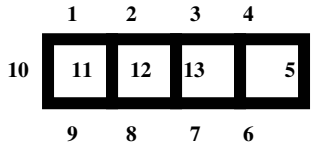
Given points, the slope and/or the y-intercept, write the equation in *y=mx+b* form for each of the following:

	Given	Equation
1.	slope = 5, y-intercept = 5	
2.	m = -2, b = 3	
3.	Slope parallel to y = 2x – 7 with the same y-intercept as y = 4x – 10	
4.	Slope parallel to x = 5 going through point A (2, 5)	
5.	Slope is 0, y-intercept = 5	
6.	slope = 4, Point A (0, 3)	
7.	Point A (4, 3), Point B (-1, 3)	
8.	Point A (0, -1), Point B (4, 8)	
9.	Slope = $\frac{3}{5}$, Point (5, 7)	
10.	m = $\frac{-5}{3}$, Point A (5, 0)	
11.	Point A (10, 19), Point B (18, 31)	
12.	Point A (4, 6), Point B (7, 15)	
13.	Point A (5, 0), Point B (0, 200)	
14.	Point A (0, 5), Point B (200, 0)	
15.	Point A (1.5, 6.5), Point B (-1.5, -2.5)	
16	Point A (1, 8.50), Point B (4, 28.50)	

3.9.3: I'm on your side.

SQUARE INVESTIGATION

Start by placing squares side by side as shown. **Note**: This arrangement of 4 squares has 13 sides.



1. Complete the following table relating the number of squares and total number of sides.

Number of squares (n)	Number of sides (s)
1	
2	
3	
4	13
5	
6	
7	

Equation: s = _____ n + _____

(Remember: You need the slope and y-intercept. Use your knowledge to calculate these values.)

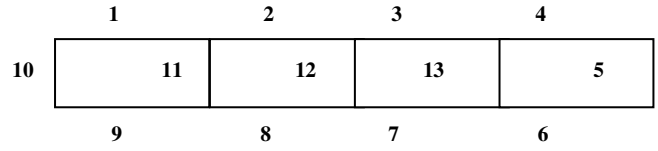
2. Use your equation to calculate the number of sides that 50 squares placed side by side would have.

3. Use your equation to calculate how many squares you would have if you counted all the sides and got a number of sides equal to 256?

3.9.3: I'm on your side. (Continued)

RECTANGLE INVESTIGATION

Start by placing rectangles side by side as shown. **Note**: This arrangement of 4 rectangles has 13 sides.



1. Complete the following table relating the number of rectangles and total number of sides.:

Number of rectangles (n)	Number of sides (s)
1	
2	
3	
4	13
5	
6	
7	

Equation: s = _____ n + _____

(Remember: You need the slope and y-intercept. Use your knowledge to calculate these values.)

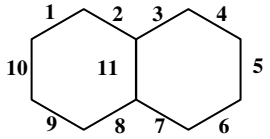
2. Use your equation to calculate the number of sides that 75 rectangles placed side by side would have.

3. Use your equation to calculate how many rectangles you would have if you counted all the sides and got a number of sides equal to 724?

3.9.3: I'm on your side. (Continued)

HEXAGON INVESTIGATION

Start by placing hexagons side by side as shown. **Note**: This arrangement of 2 hexagons has 11 sides.



1. Complete the following table relating the number of hexagons and total number of sides.

Number of hexagons (n)	Number of sides (s)
1	
2	11
3	
4	
5	
6	
7	

Equation: s = _____ n + _____

(Remember: You need the slope and y-intercept. Use your knowledge to calculate these values.)

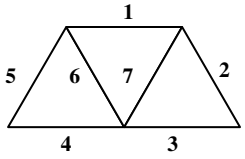
2. Use your equation to calculate the number of sides that 76 hexagons placed side by side would have.

3. Use your equation to calculate how many hexagons you would have if you counted all the sides and got a number of sides equal to 1206?

3.9.3: I'm on your side. (Continued)

TRIANGLE INVESTIGATION

Start by placing triangles side by side as shown. **Note**: This arrangement of 3 triangles has 11 sides.



1. Complete the following table relating the number of triangles and total number of sides.

Number of triangles (n)	Number of sides (s)
1	
2	
3	7
4	
5	
6	
7	

Equation: s = _____ n + _____

(Remember: You need the slope and y-intercept. Use your knowledge to calculate these values.)

2. Use your equation to calculate the number of sides that 76 triangles placed side by side would have.

3. Use your equation to calculate how many triangles you would have if you counted all the sides and got a number of sides equal to 483?

3.10.1: So, You Think You Know Everything About Lines? Review of Concepts

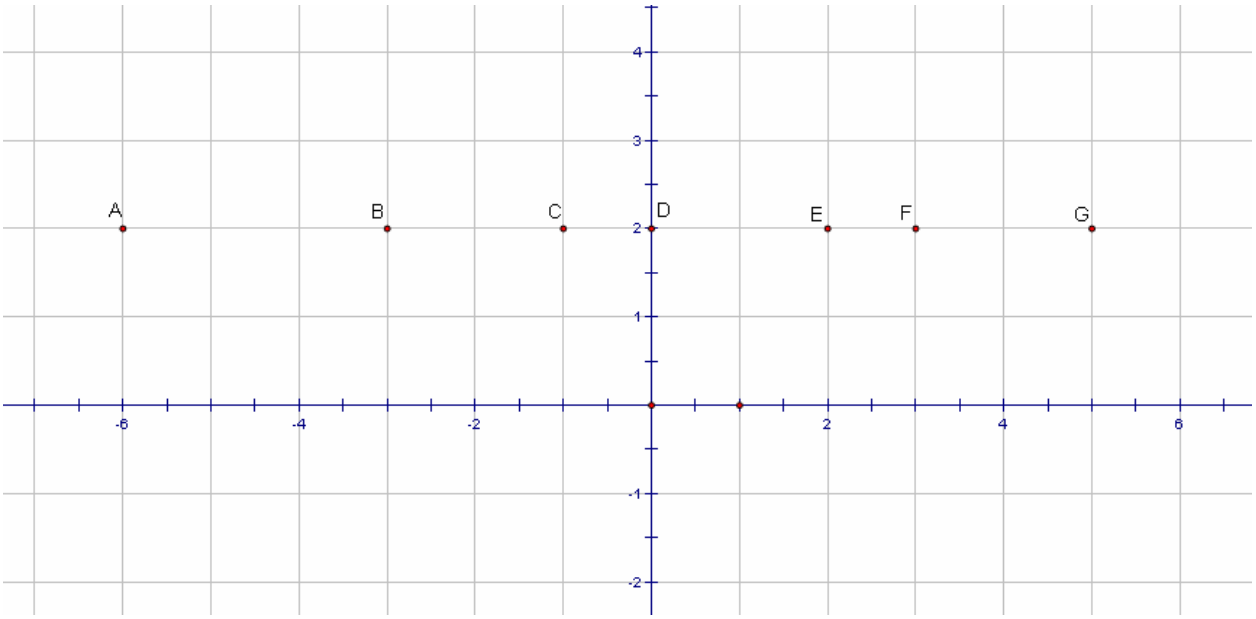
You've learned a lot up to this point in the unit, and to ensure that you still remember it, let's do a little review. With your partner complete the following questions. Feel free to consult your notebook if you cannot remember.

1. What is a y-intercept? What is an x-intercept?	Give an example of each (in coordinate form).
2. Give an example of an equation in Standard Form.	How does the Standard Form make graphing easier for you?
3. If you graph the line using the Standard Form, how many intercepts do you have?	Can you graph a line any other way so that it will only have 1 intercept? (If so, sketch an example below.)
4. Is it possible to graph a line so that it will have no intercepts? Explain.	Is it possible to have more than 2 intercepts? Explain.

3.10.2: So, You Think You Know Everything About Lines? Horizontal Lines Investigation

With your partner complete the investigation below. You will be asked to coach someone later.

1. For the graph below, write the coordinates of each point on the graph in the table below.



A (_____ , _____) B (_____ , _____)

C (_____ , _____) D (_____ , _____)

E (_____ , _____) F (_____ , _____)

G (_____ , _____)

2. What do all the points have in common?

3. There is only one point that has a coordinate of zero. What is another name for this point?

3.10.2: So, You Think You Know Everything About Lines? Horizontal Lines Investigation (Continued)

4. What is the equation of the line joining all the points? (**Hint**: The slope of the line is zero so the equation only depends on the value of the y intercept.)

5. What if all the points from the graph in question 1 shift up 2 units. What will your equation be now?

6. What if all the points from the graph in question 1 shift down 4 units. What will your equation be now?

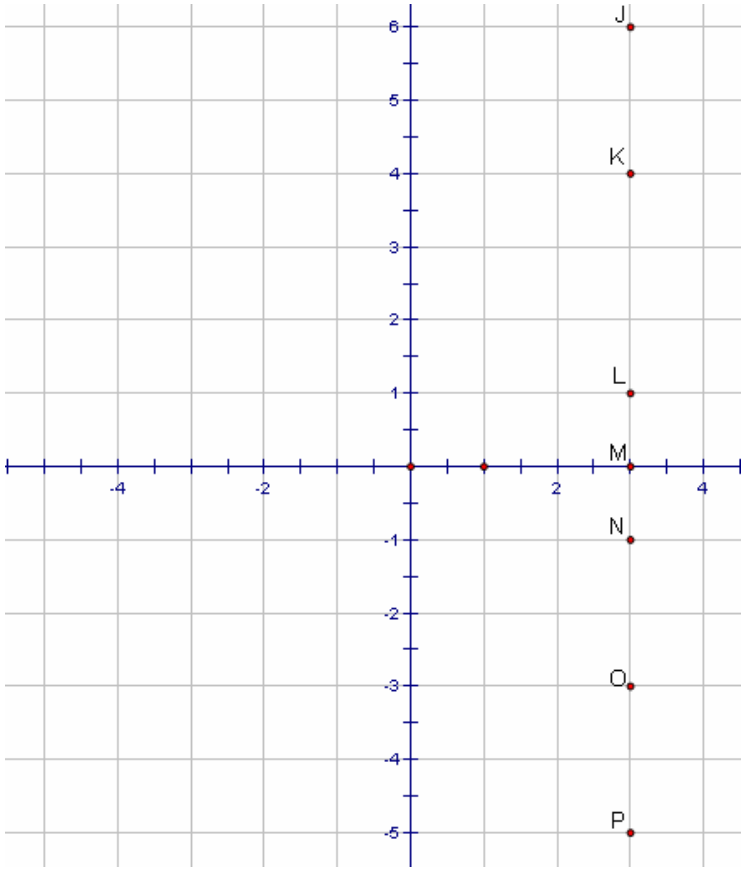
7. Write the equation of the horizontal line that passes through:
   a) (3,4) b) (-2,-4) c) (2,0)

8. Write a general equation for all horizontal lines? (**Hint**: Use **b** for the y-intercept)

3.10.3: So, You Think You Know Everything About Lines? Vertical Lines Investigation

With your partner complete the investigation below. You will be asked to coach someone later.

1. For the graph below, write the coordinates of each point on the graph in the table below.



J (_____ , _____) K (_____ , _____)

L (_____ , _____) M (_____ , _____)

N (_____ , _____) O (_____ , _____)

P (_____ , _____)

2. What do all the points have in common?

3. There is only one point that has a coordinate of zero. Is there another name for this point?

3.10.3: So, You Think You Know Everything About Lines? Vertical Lines Investigation (Continued)

4. What is the equation of the line joining all the points? (**Hint**: The slope of the line is undefined so the equation only depends on the value of the x intercept.)

5. What if all the points from the graph in question 1 shift right 2 units. What will your equation be now?

6. What if all the points from the graph in question 1 shift left 4 units. What will your equation be now?

7. Write the equation of the vertical line that passes through:
   a) (3,4) b) (-2,-4) c) (0.-1)

8. Write a general equation for all vertical lines? (**Hint**: Use **a** for the x-intercept)

3.10.6 Converting from Standard to Slope Y-Intercept Form – Practice

1. Convert the equations below into slope y-intercept form.

a) $3x + y - 1 = 0$

b) $3x - 4y - 12 = 0$

2. Now, state the slope and y-intercept for each equation.

a)

m = _____ b = _____

b)

m = _____ b = _____

3. For each equation:
   - Convert to slope y-intercept form
   - State the slope and y-intercept.
   - Graph on the grid provided. Use a different colour for each line. Label each.

a) $2x + y - 4 = 0$

m = ___ b = ___

b) $4x + 2y + 6 = 0$

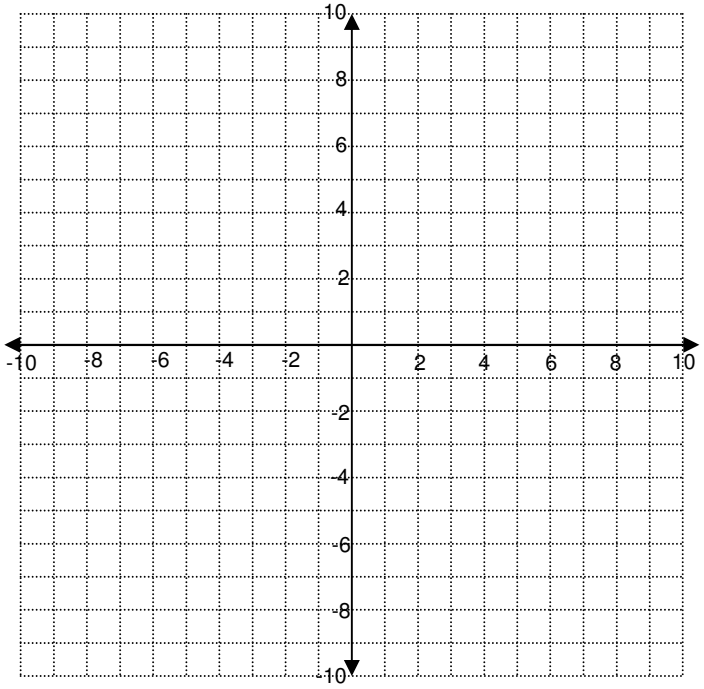
m = ___ b = ___

c) $x - y - 5 = 0$

m = ___ b = ___

d) $3x + 2y - 8 = 0$

m = ___ b = ___



Unit 3 Equations of Lines Review

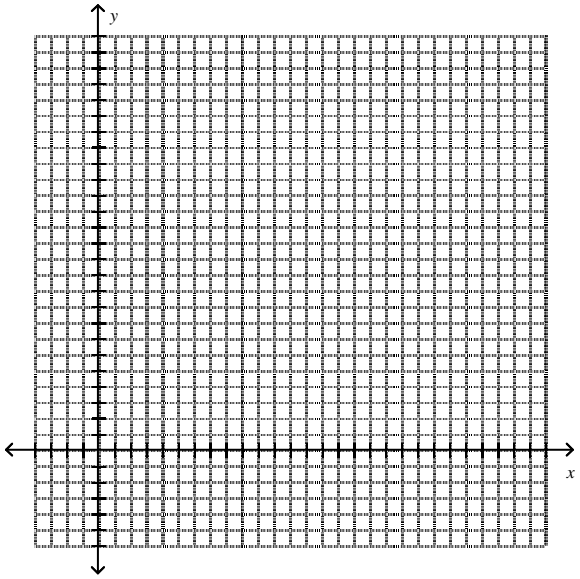
1. On a Cartesian coordinate system, plot and label the following points.

   A = (2,-1) B = (4, 10) C = (1, 7) D = (8 , 0)

   a) Draw the following lines: AB AC BC CD

   b) Calculate the slope for each line using a rate triangle:

   Slope (AB) = Slope (AC) =



   c) Calculate the following slopes algebraically. Verify with the graph.

   Slope (BC)= Slope (CD)=

2. Comparison of Slopes

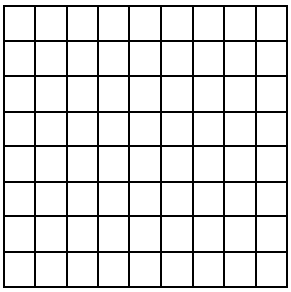
   a) If a line slants upward from left to right, it has a _____ slope.

   b) If a line slants downward from left to right, it has a _____ slope.

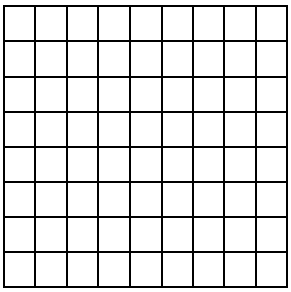
Unit 3 Equations of Lines Review (continued)

3. Draw two examples of lines with a positive slope and two examples of lines with a negative slope in the corresponding grids below.

Lines With Positive Slopes



Lines With Negative Slopes



4. Circle the equations of the lines that are horizontal.
   Underline the equations of lines that are vertical.

a) x=7	b) y=3	c) x=-3
d) y=5	e) y=3x+6	f) y=-2

5. Complete the sentences by filling in the blanks.

Horizontal Lines

a) The equations of all horizontal lines are of the form _____.

b) The slope of a horizontal line is _____.

c) Horizontal lines do <u>not</u> cross the ___ axis.

Vertical Lines

a) The equations of all vertical lines are of the form _____.

b) The slope of a vertical line is _____.

c) Vertical lines do <u>not</u> cross the ___ axis

Unit 3 Equations of Lines Review (continued)

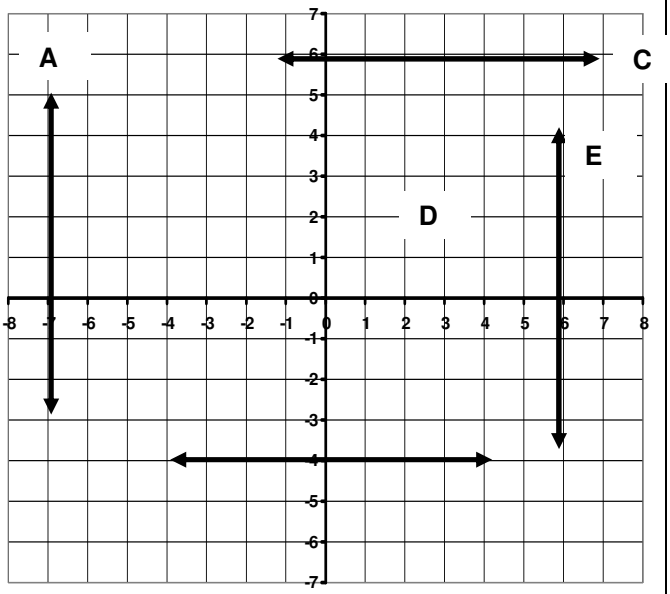
6. Write the equation of each line.

A: _____

C: _____

E: _____

F: _____



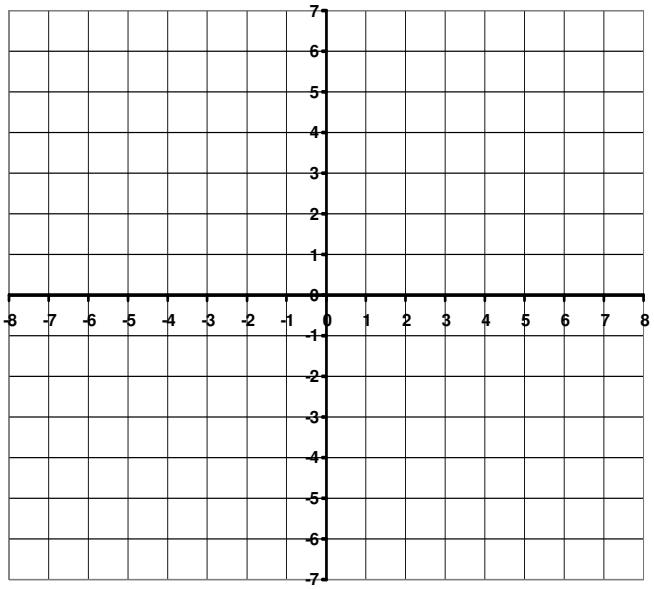
7. Graph and label the lines.

A: x = 3

B: y = -6

C: y = 5

D: x = -6



8. a) When the equation of a line has the form $y=mx+b$,

m is the _____ of the line and

b is the _____.

b) State the slope and coordinates of the y-intercept for each.

i) $y = \frac{2}{5}x - 4$ ii) $y = -3x$ iii) $y = -2x + 5$ iv) $y = -3$

9. Write the equation of each line given:

a) slope 5 and y-intercept 3

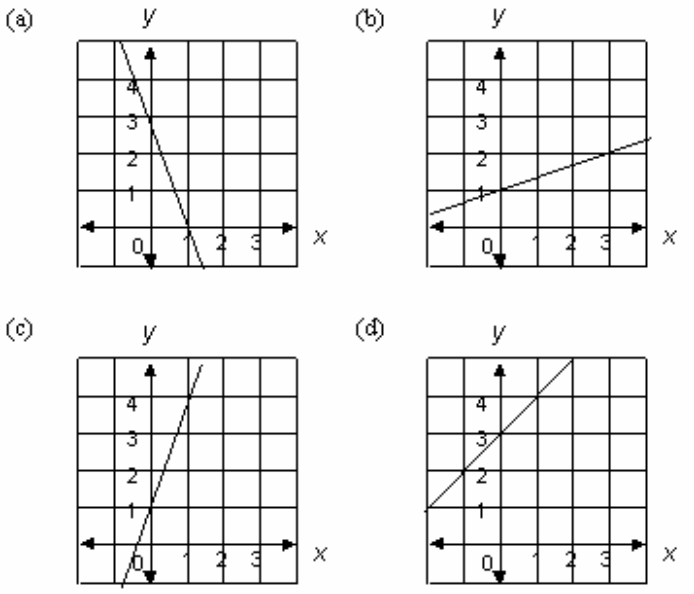
b) b= 7 m = -½

c) slope of -2 and passing through A(0, 4)

d) slope parallel to y = 3x + 7 with same y-intercept as y = 8x –19

Unit 3 Equations of Lines Review (continued)

10. Find the equation of each line.



(a) _____

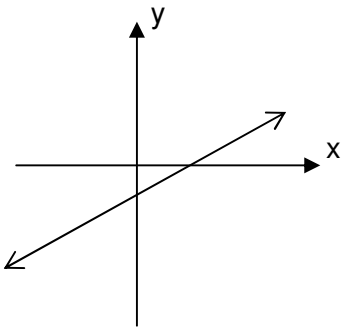
(b) _____

(c) _____

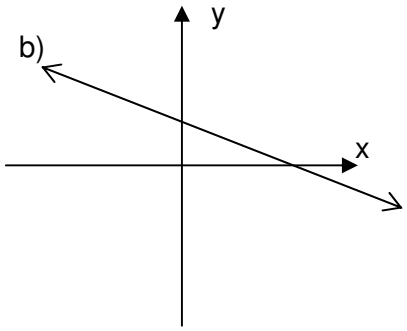
(d) _____

11. State two possible equations for each line.

a)



b)



1)_____

2)_____

1)_____

2)_____

c) Justify your choices for m and b:

Unit 3 Equations of Lines Review (continued)

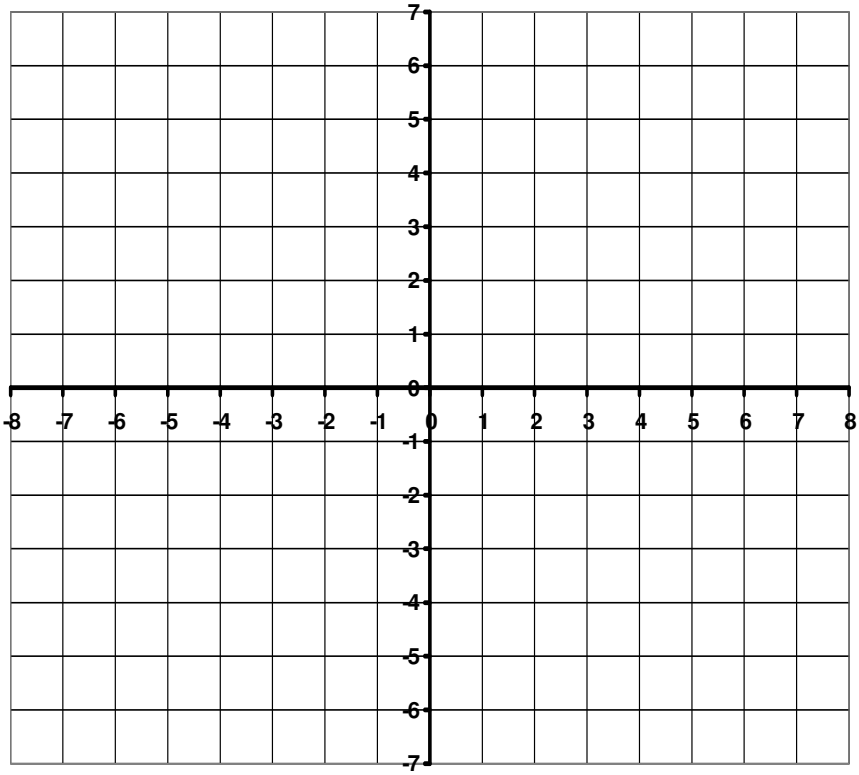
12. Draw rough sketches of the following lines showing the y-intercept and slope triangle for each.

a) $y = \frac{2}{3}x + 1$

b) $y = \frac{1}{5}x - 2$

c) $y = -3x + 2$

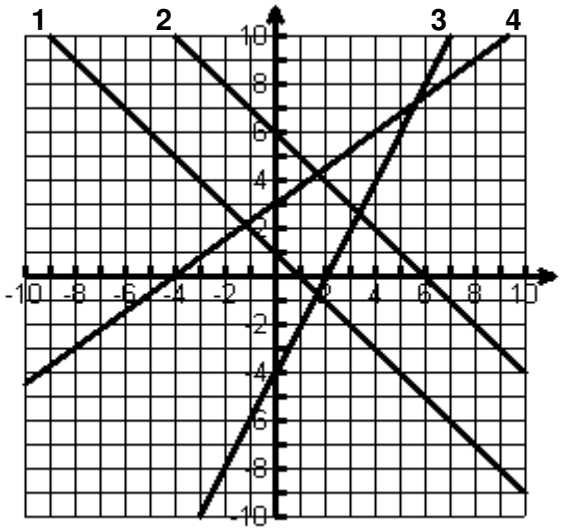
d) $y = -\frac{7}{5}x - 3$



Answer the following questions based on the lines graphed below.

13. Which lines will have positive slopes?

14. Which lines will have negative slopes?

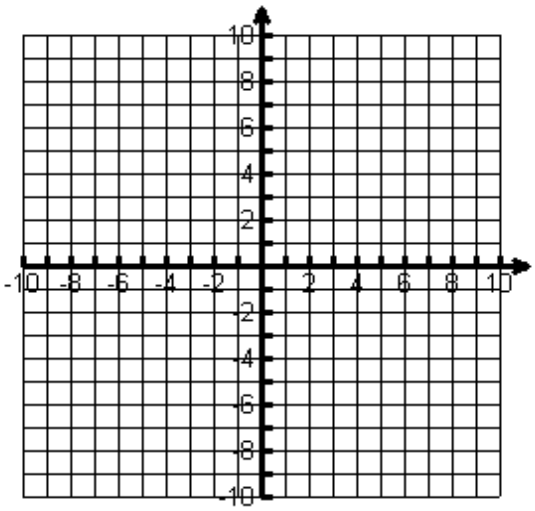


15. Fill in the table by listing the coordinates for the x-intercepts and y-intercepts.

Line	*x*-intercepts	*y*-intercepts
1		
2		(0, 6)
3		
4	(-4, 0)	

Unit 3 Equations of Lines Review (continued)

16. How does knowing the x-intercept and y-intercept help you to graph a line?



17. Graph the following lines by finding the *x* and *y*-intercepts.

a) $3x - 2y - 6 = 0$ b) $2x - 5y - 14 = 0$

18. Find the equation of the line given the point and slope.

a) (2, 1); m = 3

b) (-3, 4); m = ¾

c) (4,-5); m = -1

d) (5, 0); m = -6

19. Find the equation of the line joining the two given points.

a) (2, 1) and (-3, 4)

c) (4,-5) and (5, 0);

Unit 3 Equations of Lines Review (continued)

Scenario	**1.*Babysitting Earnings*** A family pays the babysitter $4.00/hr, plus a tip of $5.00.	**2. *Bank Account Balance*** A bank account is opened with a balance of $900. Each week $150 is withdrawn from the account.	**3. *Car Rental Costs*** Rent-A-Ride charges a flat fee of $55 plus $0.25/km to rent a car.
Introduce Variables	Let x = Let y =	Let x = Let y =	Let x = Let y =
Equation in the form of y=mx+b			
In real-life terms, what is the y-intercept?			
What would be the real-life implication of a greater y-intercept?			
What would be the real-life implication of a smaller y-intercept?			
In real-life terms, what is the rate of change (m)?			
What would be the real-life implication of a greater (steeper) rate of change?			
What would be the real-life implication of a smaller (flatter) rate of change?			